·DOCTOR FERNAND HENROTIN·
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1897·
FOR EVERY EVIL UNDER THE SUN
THERE IS A REMEDY·

"Wie das Geſtirn,
Ohne Haſt
Aber ohne Raſt,
Drehe ſich jeder
Um die eigene Laſt."

GOETHE.

TRANSACTIONS OF THE AMERICAN GYNECOLOGICAL SOCIETY.

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NOTE.

The Society does not hold itself responsible for the views enunciated in the papers read at its meetings.

JOSEPH TABER JOHNSON, M.D., *Secretary*,
926 Farragut Square, Washington, D. C.

DR BENROTIN,
353 LA SALLE AVE

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OFFICERS AND FELLOWS

OF THE

AMERICAN GYNECOLOGICAL SOCIETY.

1888.

OFFICERS FOR 1888–1889.

PRESIDENT.

HENRY P. C. WILSON, Baltimore.

VICE-PRESIDENTS.

WILLIAM T. LUSK, New York.
EDWARD W. JENKS, Detroit.

SECRETARY.

JOSEPH TABER JOHNSON, Washington.

TREASURER.

MATTHEW D. MANN, Buffalo.

OTHER MEMBERS OF THE COUNCIL.

ELY VAN DE WARKER, Syracuse.
GEORGE J. ENGELMANN, St. Louis.
JOSEPH E. JANVRIN, New York.
B. B. BROWNE, Baltimore.

HONORARY FELLOWS.

* Deceased.

ELECTED

1877. *JOHN L. ATLEE, M.D., Lancaster, Pa.
1884. GEORGE GRANVILLE BANTOCK, M.D., London, Eng.
1876. ROBERT BARNES. M.D., London, England.
1878. JOHN S. BILLINGS, M.D., LL.D., U. S. Army, Washington.
1877. JOHN C. DALTON, M.D., New York.
1888. AMEDIE DOLERIS, M.D., Paris, France.
1878. J. MATTHEWS DUNCAN, M.D., London, England.
1888. ALEXANDER DUNLAP, M.D., Springfield, Ohio.
1876. *JOSEPH A. EVE, M.D., Augusta, Georgia.
1888. GRAILY HEWITT, M.D., London, England.
1881. J. BRAXTON HICKS, M.D., London, England.
1876. THOMAS KEITH, M.D., Edinburgh, Scotland.
1888. GILMAN KIMBALL, M.D., Lowell, Massachusetts.
1888. AUGUST MARTIN, M.D., Berlin, Germany.
1876. *ALFRED H. M'CLINTOCK, M.D., Dublin, Ireland.
1888. EMIL NOEGGERATH. M.D., New York.
1877. CHARLES PAJOT, M.D., Paris, France.
1885. W. S. PLAYFAIR, M.D., London, England.
1888. WILLIAM OVEREND PRIESTLEY, M.D., London, Eng.
1876. *KARL SCHROEDER, M.D., Berlin, Germany.
1888. ALEX. RUSSELL SIMPSON, M.D., Edinburgh, Scotland.
1876. *GUSTAV SIMON, M.D., Heidelberg, Germany.
1880. D. HUMPHREYS STORER, M.D., Boston.
1882. LAWSON TAIT, Esq., Birmingham, England.
1881. S. TARNIER, M.D., Paris, France.
1882. J. KNOWSLEY THORNTON, Esq., London, England.
1888. ISAAC E. TAYLOR, M.D., New York.
1876. Sir T. SPENCER WELLS, London, England.
1881. F. WINCKEL, M.D., Dresden, Germany.
1876. *MARMADUKE B. WRIGHT, M.D., Cincinnati.

Total, twenty-four Honorary Fellows.

FELLOWS.

* Deceased. † Resigned.

1888.—Ashby, Thomas A., A.M., M.D., Professor of Obstetrics and Clinical Gynecology in the Woman's Medical College of Baltimore; Consulting Gynecologist to the Home of Incurables; Obstetrician and Gynecologist to the Good Samaritan Hospital. 1225 Madison Avenue, Baltimore.

Founder.—*Atlee, Washington L., M.D. 1878.

1886.—Baer, B. F., M.D. President Obstetrical Society of Philadelphia; Professor of Gynecology in the Philadelphia Polyclinic and College of Graduates in Medicine. 2010 Chestnut Street, Philadelphia.

1882.—Baker, William H., M.D. Professor of Gynecology, Harvard University; Surgeon to the Free Hospital for Women. *Council*, 1886. 22 Mt. Vernon Street, Boston.

Founder.—Barker, Fordyce, M.D., LL.D. Professor of Clinical Midwifery and Diseases of Women, Bellevue Hospital Medical College; Consulting Physician to Bellevue Hospital, etc. *President*, 1876–'77. *Council*, 1883. 24 East Thirty-eighth Street, New York.

Founder.—Battey, Robert, M.D. Formerly Professor of Obstetrics, and Clinical Professor of Gynecological Surgery, Atlanta Medical College. *Vice-President*, 1880. *President*, 1888. 412 First Avenue, Rome, Georgia.

Founder.—Bixby, George H., M.D. Surgeon to St. Elizabeth's Hospital for Women; Physician to the Out-patient Department for the Diseases of Women, Boston City Hospital. *Council*, 1882. 143 Boylston Street, Boston.

1888.—Boldt, H. I., M.D., 245 West 42d Street, New York.

1878.—† Bozeman, Nathan, M.D. 1886.

1881.—Browne, B. B., M.D. Professor of Gynecology and Obstetrics in the Baltimore Polyclinic and Post-Graduate

Medical School; Professor of Diseases of Women in the Woman's Medical College of Baltimore; Gynecologist to the Woman's and Child's Hospital of Baltimore. *Council*, 1885, 1889. 307 Madison Avenue, Baltimore.

Founder.—* Buckingham, Charles E., M.D. 1877.

Founder.—Busey, Samuel C., M.D., LL.D. Member of the Association of American Physicians; Member of the American Pediatric Society; Honorary Member of the Medical Society of the State of New York; Corresponding Member of the Boston Gynecological Society. *Vice-President*, 1883. 901 Sixteenth Street, Washington.

Founder.—Byford, William H., M.D., LL.D. Professor of Gynecology, Rush Medical College. *Vice-President*, 1876–'77. *Council*, 1878. *President*, 1881. 125 State Street, Chicago.

Founder.—Byrne, John, M.D., M.R.C.S.E. Formerly Clinical Professor of Uterine Surgery, Long Island College Hospital; Surgeon-in-Chief to St. Mary's Hospital for Diseases of Women. *Council*, 1879, 1883. 314 Clinton Street, Brooklyn, N. Y.

Founder.—Campbell, Henry F., A.M., M.D. Professor of Principles and Practice of Surgery and of Gynecology, University of Georgia; Surgeon to the City Hospital, Augusta. *Vice-President*, 1881. *Council*, 1883. 715 Broad Street, Augusta, Georgia.

Founder.—Chadwick, James R., A.M., M.D. Clinical Instructor in Gynecology, Harvard University. *Secretary*, 1876–'82. *Vice-President*, 1883, 1888. 270 Clarendon Street, Boston.

1888.—Coe, Henry C., M.D., New York.

1888.—Coleman, John Scott, M.D. Fellow of the American Surgical Association. 563 Green Street, Augusta, Ga.

Founder.—Drysdale, Thomas M., A.M., M.D. *Council*, 1886. 1531 Arch Street, Philadelphia.

1888.—Dudley, A. Palmer, M.D. Instructor in Gynecology in the New York Post-Graduate Medical School; Surgeon in Charge of St. Elizabeth's Hospital; Visiting Gynecologist to Randall's Island Hospital; Gynecologist to Northeastern Dispensary. New York.

1886.—Dudley, Emilius Clark, A.B., M.D. Professor of Gynecology in Chicago Medical College; Fellow of the British Gynecological Society. 70 Monroe Street, Chicago, Ill.

1879.—Duer, Edward L., M.D. Lecturer on Diseases of Women and Children at the Philadelphia Hospital; Gynecologist to the Presbyterian Hospital. 1704 Arch Street, Philadelphia.

1877.—† Dunlap, Alexander, A.M., M.D. 1886.

1887.—Emmet, Bache McE., M.D. Professor of Gynecology New York Post-Graduate Medical School and Hospital; Assistant Surgeon at the Woman's Hospital of the State of New York. 18 East 30th Street, New York.

Founder.—Emmet, Thomas Addis, M.D., LL.D. Surgeon to the Woman's Hospital of the State of New York; Consulting Physician to the Roosevelt Hospital, and to the New York Foundling Asylum. *Council*, 1878–'79. *President*, 1882. 93 Madison Avenue, New York.

Founder.—Engelmann, George J., A.M., M.D. Master in Obstetrics, Vienna; Professor of Obstetrics and Diseases of Women, St. Louis Post-Graduate School; Consulting Surgeon to the Female Hospital, and to the St. Anne's Lying-in Asylum. *Council*, 1879, 1882. *Vice-President*, 1885. 3003 Locust Street, St. Louis.

1881.—Foster, Frank P., M.D. *Secretary*, 1882–'85. *Council*, 1885, 1888. 16 East Thirty-first Street, New York.

1877.—Garrigues, Henry J., A.M., M.D. Professor of Obstetrics at the New York Post-graduate Medical School and Hospital: Obstetric Surgeon to the New York Maternity Hospital; Obstetrician to the New York Infant Asylum; Gynecologist to the German Hospital and Dispensary of the City of New York. *Council*, 1882. 155 Lexington Avenue, New York.

1888.—Gehrung, E. C., M.D., St. Louis.

1881.—Gillette, Walter R., M.D. Consulting Gynecologist to the Charity Hospital; Physician to the New York Lying-in Asylum; Obstetric Surgeon to the Maternity Hospital; Gynecologist to St. Francis's Hospital; Visiting Physician to the Bellevue Hospital. 149 West Twenty-third Street, New York.

Founder.—Goodell, William, A.M., M.D. Professor of Gynecology, University of Pennsylvania. *Council*, 1876–'77, 1880. *Vice-President*, 1878. 1418 Spruce Street, Philadelphia.

1877.—Goodman, John, M.D. Professor of Obstetrics, Louisville Medical College. 236 Third Street, Louisville.

1888.—Gordon, S. C., M.D., Portland, Maine.

1886.—Green, Charles M., A.B., M.D. Instructor in Obstetrics, Harvard University; Obstetric Physician to the Boston Dispensary; Assistant Physician to the Boston Lying-in Hospital; Physician to the Out-patient Department for the Diseases of Women, Boston City Hospital. 78 Marlborough Street, Boston.

1887.—Hanks, Horace Tracy, M.D. Professor of Gynecology New York Post-Graduate School and Hospital; Assistant Surgeon New York State Woman's Hospital; Fellow British Gynecological Society; President of the New York Obstetrical Society. 55 East Fifty-ninth Street, New York.

Founder.—Howard, William T., M.D. Professor of the Diseases of Women and Children, and of Clinical Medicine, University of Maryland; Gynecologist to the University Hospital; Gynecologist to the Woman's Hospital of the State of Maryland; Consulting Physician to the Hebrew Hospital and Asylum Association of Baltimore, Maryland. *Vice-President*, 1880. *Council*, 1883. *President*, 1884. 804 Madison Avenue, Baltimore.

1885.—Hunter, James Bradbridge, M.D. Surgeon to the Woman's Hospital, New York; Surgeon to the New York Cancer Hospital; Professor of Gynecology in the New York Polyclinic; Consulting Surgeon to the New York Infirmary for Women and Children. *Council*, 1888. 2 East Thirty-third Street, New York.

Founder.—Ingham, James V., M.D. 1342 Spruce Street, Philadelphia.

1877.—Jackson, A. Reeves, A.M., M.D. Professor of the Diseases of Women and of Clinical Gynecology, College of Physicians and Surgeons of Chicago; formerly Surgeon-in-Chief of the Woman's Hospital of the State of Illinois; Consulting Surgeon to the Dispensary of the Woman's Christian Association; Chief of the Gynecological Department of the West Side Dispensary. *Council*, 1883, 1884, 1886. *Vice-President*, 1888. 271 Michigan Avenue, Chicago.

1886.—Janvrin, Joseph E., M.D. Gynecologist to the Skin

and Cancer Hospital; Surgeon to St. Elizabeth's Hospital. *Council*, 1889. 191 Madison Avenue, New York.

Founder.—JENKS, EDWARD W., M.D., LL.D. Formerly Professor of the Medical and Surgical Diseases of Women and of Clinical Gynecology, Chicago Medical College; Gynecologist to the Mercy Hospital. *Council*, 1879. *Vice-President*, 1889. 84 Lafayette Avenue, Detroit.

1885.—JEWETT, CHARLES, A.M., M.D. Professor of Obstetrics and Diseases of Children, Long Island College Hospital, Brooklyn; Attending Physician to Long Island College Hospital; Physician-in-Chief to Department of Children's Diseases, St. Mary's Hospital, Brooklyn; Fellow British Gynecological Society. 307 Gates Avenue, Brooklyn.

Founder.—JOHNSON, JOSEPH TABER, A.M., M.D. Professor of Gynecology, University of Georgetown; Gynecologist to the Providence Hospital; Member British Medical Association; President Woman's Dispensary; President Medical Society of the District of Columbia (1887); Fellow of the British Gynecological Society. President Washington Obstetrical and Gynecological Society. *Council*, 1881, 1884. *Secretary*, 1885–'89. 926 Farragut Square, Washington.

1886.—JOHNSTONE, ARTHUR W., A.M., M.D. Fellow of the British Gynecological Society. Danville, Ky.

1887.—KELLY, HOWARD A., M.D. Associate Professor Obstetrics University of Pennsylvania; Surgeon in Charge Kenington Hospital for Women; Gynecologist to the North Fourth Street Mission. 2134 Hancock Street, Philadelphia,

1877.—† KIMBALL, GILMAN, M.D. 1887.

1886.—KING, ALBERT F. A., A.M., M.D. Professor of Obstetrics and Diseases of Women and Children in the Medical Department of the Columbian University, Washington, D. C., and in the University of Vermont; President of the Washington Obstetrical and Gynecological Society (1885–'86); Fellow of the British Gynecological Society; one of the Attending Physicians to the Children's Hospital, Washington, D. C.; Consulting Physician to the Woman's Dispensary. 726 Thirteenth Street, Washington.

1887.—KOLLOCK, CORNELIUS, A.M., M.D. Ex-President South Carolina Medical Association; Corresponding Member Boston Natural History Society. Cheraw, S. C.

1881.—Lee, Charles Carroll, A.M., M.D. Consulting Surgeon to Charity Hospital; Surgeon to the Woman's Hospital of the State of New York. Physician to the New York Foundling Asylum. *Council*, 1886. 79 Madison Avenue, New York.

Founder.—Lusk, William T., M.D. Professor of Obstetrics and of the Diseases of Women and Children, and of Clinical Midwifery, Bellevue Hospital Medical College; Physician to Bellevue Hospital; Obstetric Surgeon to the Maternity Hospital; Visiting Physician to the Emergency Lying-in Hospital. 47 East Thirty-fourth Street, New York.

Founder.—† Lyman, George H., M.D. 1885.

1882.—Mann, Matthew D., A.M., M.D. Professor of Obstetrics and Gynecology, University of Buffalo; Gynecologist and Consulting Obstetrician to the Buffalo General Hospital. *Treasurer*, 1883–'89. 37 Allen Street, Buffalo, N. Y.

1886.—Marion-Sims, H., M.D. Surgeon to St. Elizabeth's Hospital; Instructor of Gynecology at the New York Polyclinic. 267 Madison Avenue, New York.

1883.—Maury, R. B., M.D. *Council*, 1885, 1888. 273 Beale Street, Memphis, Tenn.

Founder.—Mundé, Paul F., M.D. Professor of Gynecology, New York Polyclinic; Gynecologist to Mount Sinai Hospital. *Treasurer*, 1876–'83. *Vice-President*, 1884. 20 West Forty-fifth Street, New York.

Founder.—† Noeggerath, Emil, M.D. 1887.

1880.—Palmer, Chauncy D., M.D. Professor of Obstetrics, the Medical and Surgical Diseases of Women, and Clinical Gynecology in the Medical College of Ohio; Gynecologist to the Cincinnati Hospital. *Council*, 1888. 308 West Seventh Street, Cincinnati.

1885.—Parish, William H., M.D. Obstetrician to the Philadelphia Hospital; Consulting Obstetrician to the Philadelphia Lying-in Charity; Professor of Anatomy in the Woman's Medical College of Pennsylvania. 1435 Spruce Street, Philadelphia.

Founder.—Parvin, Theophilus, M.D., LL.D. Professor of Obstetrics and of the Diseases of Women and Children in the Jefferson Medical College. *Council*, 1876–'77. *Vice-President*, 1882 and 1886. 1626 Spruce Street, Philadelphia.

Founder.—* PEASLEE, E. RANDOLPH, M.D., LL.D. 1878.

Founder.—† PENROSE, RICHARD A. F., A.M., M.D., LL.D. 1885.

1881.—POLK, WILLIAM M., M.D. Professor of Obstetrics and Diseases of Women and Children, University of the City of New York; Physician to Bellevue Hospital, and to the Emergency Lying-in Hospital; Consulting Gynecologist to St. Luke's Hospital. 7 East 36th Street, New York.

1877.—REAMY, THADDEUS A., A.M., M.D. Professor of Obstetrics, Clinical Midwifery, and of the Diseases of Children, Medical College of Ohio; Gynecologist to the Good Samaritan Hospital. *Vice-President*, 1881. *Council*, 1883. *President*, 1885. 280 West Fourth Street, Cincinnati.

Founder.—REEVE, JOHN C., M.D. President of the Medical Staff of St. Elizabeth's Hospital; formerly Professor of Materia Medica and Therapeutics, Medical College of Ohio. *Council*, 1881 and 1885. *Vice-President*, 1887. Corner of Third and Wilkinson Streets, Dayton, Ohio.

1877.—REYNOLDS, JOHN P., M.D. Late Professor of Obstetrics, Harvard University; Consulting Surgeon to the Boston City Hospital. 236 Clarendon Street, Boston.

Founder.—RICHARDSON, WILLIAM L., M.D. Professor of Obstetrics, Harvard University; Physician to the Boston Lying-in Hospital, and Visiting Physician to the Massachusetts General Hospital. *Vice-President*, 1884. 225 Commonwealth Avenue, Boston.

1879.—* SCOTT, JOHN, M.D., M.R.C.S.I. 1886.

Founder.—* SIMS, J. MARION, M.D., LL.D. 1883.

Founder.—† SINCLAIR, ALEXANDER D., M.D. 1882.

Founder.—SKENE, ALEXANDER J. C., M.D. Professor of the Medical and Surgical Diseases of Women, Long Island College Hospital. *Council*, 1878, 1880. *President*, 1886–'87. 167 Clinton Street, Brooklyn.

Founder.—* SMITH, ALBERT H., M.D. 1886.

Founder.—‡ STORER, D. HUMPHREYS, M.D., LL.D. *Vice-President*, 1879. 182 Boylston Street, Boston.

1879.—SUTTON, R. STANSBURY, M.D., LL.D. Late President of the American Academy of Medicine; Fellow of the

‡ See Honorary Fellows.

British Gynecological Society; Surgeon to the Terrace Bank Hospital for Women. *Council*, 1883. 419 Penn Avenue, Pittsburg, Pa.

Founder.—† TAYLOR, ISAAC E., M.D., LL.D. 1887.

Founder.—THOMAS, T. GAILLARD, M.D., LL.D. Clinical Professor of the Diseases of Women and Children, College of Physicians and Surgeons; Surgeon to the Woman's Hospital of the State of New York; Consulting Physician to the Nursery and Child's Hospital, New York, and to St. Mary's Hospital, Brooklyn. *President*, 1879. *Council*, 1883. 600 Madison Avenue, New York.

Founder.—* TRASK, JAMES D., M.D. 1883.

1879.—† UNDERHILL, J. W., M.D. 1886.

Founder.—VAN DE WARKER, ELY, M.D. Surgeon to the Central New York Hospital for Women; Surgeon to the Syracuse Woman's and Children's Hospital. *Council*, 1884–'89. 104 Fayette Park, Syracuse, N. Y.

Founder.—* WALLACE, ELLERSLIE, M.D. 1885.

Founder.—* WHITE, JAMES P., M.D. 1881.

1877.—WILSON, ELLWOOD, M.D. Consulting Physician to the Philadelphia Lying-in Charity, to the Woman's Hospital, and to the Preston Retreat. *Vice-President*, 1886–'87. 1517 Walnut Street, Philadelphia.

Founder.—WILSON, HENRY P. C., M.D. Ex-President of the Medical and Chirurgical Faculty of Maryland, and of the Baltimore Academy of Medicine; President of the Gynecological and Obstetrical Society of Baltimore; Surgeon to the Hospital for the Women of Maryland; Consulting Gynecologist to St. Agnes's Hospital, and to the Union Protestant Infirmary; Member of the British Medical Association; Fellow of the British Gynecological Society, etc. *Vice-President*, 1879. *Council*, 1884. *President*, 1889. 146 Park Avenue, Baltimore.

1886.—WYLIE, W. GILL, M.D. Professor of Gynecology in the New York Polyclinic; Visiting Gynecologist to Bellevue Hospital, New York; Surgeon to St. Elizabeth's Hospital, New York; Member of the Academy of Medicine; Fellow of the British Gynecological Society. 40 West 40th Street, New York.

Total, sixty-five Active Fellows.

MINUTES OF THE PROCEEDINGS

AT THE

THIRTEENTH ANNUAL MEETING

OF THE

AMERICAN GYNECOLOGICAL SOCIETY,

HELD IN THE HALL OF

THE COLUMBIAN UNIVERSITY,

Washington, D. C.

SEPTEMBER, 18, 19, AND 20, 1888.

THIRTEENTH ANNUAL MEETING.

WASHINGTON, TUESDAY, WEDNESDAY, AND THURSDAY, *September*, 18, 19, *and* 20, 1888.

THE following-named Fellows were present:

B. F. BAER	PHILADELPHIA.
WILLIAM H. BAKER	BOSTON.
FORDYCE BARKER	NEW YORK.
ROBERT BATTEY	ROME, GEORGIA.
B. B. BROWNE	BALTIMORE.
SAMUEL C. BUSEY	WASHINGTON.
JOHN BYRNE	BROOKLYN.
THOMAS DRYSDALE	PHILADELPHIA.
E. C. DUDLEY	CHICAGO.
EDWARD L. DUER	PHILADELPHIA.
BACHE McE. EMMET	NEW YORK.
GEORGE J. ENGELMANN	ST. LOUIS.
HENRY J. GARRIGUES	NEW YORK.
WILLIAM GOODELL	PHILADELPHIA.
CHARLES M. GREEN	BOSTON.
H. T. HANKS	NEW YORK.
JAMES B. HUNTER	NEW YORK.
JOSEPH E. JANVRIN	NEW YORK.
EDWARD W. JENKS	DETROIT.
CHARLES JEWETT	BROOKLYN.
JOSEPH TABER JOHNSON	WASHINGTON.
ARTHUR W. JOHNSTONE	DANVILLE, KY.
HOWARD A. KELLY	PHILADELPHIA.
ALBERT F. A. KING	WASHINGTON.
CORNELIUS KOLLOCK	CHERAW, S. C.
WILLIAM T. LUSK	NEW YORK.
MATTHEW D. MANN	BUFFALO.
H. MARION-SIMS	NEW YORK.
WILLIAM H. PARISH	PHILADELPHIA.
THEOPHILUS PARVIN	PHILADELPHIA.
WILLIAM M. POLK	NEW YORK.
THADDEUS A. REAMY	CINCINNATI.
JOHN C. REEVE	DAYTON, OHIO.
ALEXANDER J. C. SKENE	BROOKLYN.
R. STANSBURY SUTTON	PITTSBURG.

T. GAILLARD THOMAS	New York
ELY VAN DE WARKER	Syracuse.
HENRY P. C. WILSON	Baltimore.
W. GILL WYLIE	New York.

Total, thirty-nine Fellows.

First Day—*Tuesday, September 18, 1888.*

Morning Session.—The meeting was called to order at 10 A. M. by the President, Dr. Robert Battey, of Rome, Georgia.

The roll was called by the Secretary, and thirty-nine Fellows answered to their names.

The President called upon Dr. Samuel C. Busey, of Washington, who delivered the following address of welcome:

Mr. President and Fellows: The American Gynecological Society is always welcome in this the Nation's capital city. We are, it is true, indebted to the courtesy of the Boston Fellows, who voluntarily relinquished their claim, even after their city had been selected as the place for the present meeting. Yet the resident Fellows, the profession and citizens of this city, and the members of other special medical societies which have assembled here to-day, offer to you the welcome which is due to an organization of physicians which numbers among its membership so many men whose scientific work is known throughout those parts of the civilized world where medical science is cultivated and appreciated.

As the Chairman of the Committee of Arrangements of the Congress of American Physicians and Surgeons, I take more than ordinary pleasure in bidding you welcome to-day. You have come to meet others equally eminent in other special departments of medicine, who are seeking to perfect and solidify an organization which will unite men of preëminent abilities in a common effort to elevate medical science in this country to that high standard which shall be commensurate with the progress of research into the cause, nature, and treatment of disease. You have come also to meet, and have brought with you, men from abroad whose honorable bearing and good work have added lustre and renown to the profession. Since you have come to aid others in their efforts to promote the welfare of a common

humanity, I need not, therefore, offer any apology for the gratification it gives me to welcome you here to-day.

Without your presence the assemblage of distinguished men here to-day would have seemed incomplete. A society that has given to the world thirteen volumes of *Transactions*, replete with valuable information, and has won in this country certainly the leadership in obstetrics and gynecology, could not relinquish its position as the equal of any other special medical society by its absence from this city on this occasion. It must necessarily be a constituent part of any great assemblage of eminent physicians and surgeons. And the welcome I give you is enhanced by the fact that your presence assures the success of an organization which will establish a new era in the history of American medicine; an era that means a pull all together, and all along the line to promote the progress of scientific medicine. Whilst I cannot offer you the excellence in social entertainment with which the Boston Fellows would have greeted you, I will promise you a more varied intellectual feast.

Upon the recommendation of the Council, the following-named physicians were invited, by vote of the Society, to participate in its discussions as its invited guests: Sir Spencer Wells, Dr. W. O. Priestly, and Dr. Graily Hewitt, of London; Dr. H. C. Cook and Dr. Cameron, of Canada; Dr. C. D. Kollock, of South Carolina; Dr. J. Duncan Emmet and Dr. Sherman Van Ness, of New York; Dr. Edward Warren Sawyer, of Chicago; Dr. Michell, of South Carolina; Dr. W. W. Jaggard, of Chicago; Dr. A. B. Carpenter, of Ohio; Dr. Joseph F. Ross, of Toronto; Dr. N. Lincoln McPhalter, Dr. Henry Howett, and Dr. Angus McKinnon, of Guelph, Canada; Dr. J. W. Roseburg, of Hamilton, Canada; Dr. G. L. Magruder, Dr. N. S. Lincoln, Dr. P. J. Murphy, Dr. G. W. Johnston, Dr. H. H. Barker, Dr. Robert M. O'Riley (U.S. Army), Dr. Jeannette J. Sumner, Dr. George Byrd Harrison, Dr. C. H. A. Kleinschmidt, Dr. S. S. Adams, Dr. M. F. Cuthbert, Dr. Thomas C. Smith, Dr. J. M. Toner, Dr. George C. Ober, Dr. J. R. Bromwell, Dr. C. E. Hagner, all of Washington; Dr. W. E. Ford, of Utica, New York; Dr. H. T. Byford, of Chicago; Dr. Joseph Eastman, of Indianapolis; Dr. Sinclair, of Manchester, England; Dr. S. C. Gordon, of Maine; Dr. Ashby, of Baltimore; Dr. Dudley, of

New York; Dr. Martin, of Chicago; Dr. F. H. Ingram, of New York; Dr. G. S. Knox, of Chicago; Dr. Robert Harvey, of Calcutta; Dr. Montgomery and Dr. Stuart, of Philadelphia.

Upon motion of Dr. Fordyce Barker, the order of business was suspended and the resolution of last year declining to enter the Congress of American Physicians and Surgeons was rescinded, and Dr. Barker's motion to go into the Congress was unanimously passed. Upon motion of Dr. Busey, Dr. Barker was appointed from our Society as a member of the Executive of the Congress.

Upon motion of the Secretary, seconded by Dr. Dudley, of Chicago, the action of the Secretary in dropping from the list of Fellows the name of Dr. Edward Warren Sawyer, on account of three years' unexcused absence from our meetings, was also rescinded, and his name was restored to the active list.

Papers were then read as follows:

1. "Ureteritis, its Diagnosis and Symptomatology," by Dr. Howard A. Kelly, of Philadelphia.

Discussed by Dr. Polk, Dr. Bache Emmet, Dr. H. T. Byford, and Dr. Baker.

2. "The Cause and Treatment of Urethrocele," by Dr. Thomas Addis Emmet, of New York.

In Dr. Emmet's absence this paper was read by his son, Dr. Duncan Emmet.

Discussed by Dr. W. O. Priestley, of London; Dr. Skene, Dr. Lusk, Dr. Kelly, and Dr. Engelmann.

3. "The Treatment of Pelvic Abscess," by Dr. R. Stansbury Sutton, of Pittsburg.

Discussed by Dr. Goodell, Dr. Thomas, Dr, Wylie, Dr. Parish, Dr. Polk, Dr. Byford, Dr. Kelly, Dr. Johnstone, Dr. Baldy, and Dr. Reamy.

Afternoon Session.

4. "Cases of Ovariotomy performed Twice on the Same Patient," by Sir Spencer Wells, Bart., of London.

Discussed by Dr. Thomas, Dr. Goodell, Dr. Hunter, and Dr. Kelly.

5. "On the New Cæsarean Section," by Dr. William T. Lusk, of New York.

Discussed by Dr. Garrigues, Dr. Engelmann, and Dr. Polk.

6. "The Etiology, Pathology, and Treatment of Anteflexion of the Uterus," by Dr. T. Gaillard Thomas, of New York.

Discussed by Dr. Graily Hewitt and Dr. Priestley, of London; Dr. Van de Warker, Dr. H. P. C. Wilson, Dr. Bache Emmet, Dr. Goodell, and Dr. Wylie.

SECOND DAY—*Wednesday, September 19th.*

Morning Session.—7. "High Amputation of the Cervix Uteri for Cancer," by Dr. Thaddeus A. Reamy, of Cincinnati.

Discussed by Dr. Baker and Dr. Byrne.

8. "The President's Address."

9. "The Pressure Forceps *versus* the Ligature and Suture in Vaginal Hysterectomy," by Dr. E. C. Dudley, of Chicago.

Discussed by Dr. Hunter, Dr. H. T. Byford, Dr. Reamy, and Dr. Lane, of California.

Afternoon Session.

10. "A Case of Rupture of the Uterus in Labor—the Child born Alive, the Mother subsequently having a full-time Child in Normal Labor," Dr. C. M. Green, of Boston.

Discussed by Dr. Parvin.

11. "On the Severe Vomiting of Pregnancy," Dr. Graily Hewitt, of London.

Discussed by Dr. Fordyce Barker, Dr. Skene, and Dr. Wylie.

12. "On Emdometritis Treated by Drainage," by Dr. W. M. Polk, of New York.

13. "The Dangers of Galvano-puncture in Pelvic Tumors," by Dr. Ely Van de Warker, of Syracuse.

Discussed by Dr. Martin, Dr. Parvin, Dr. Skene, Dr. Wilson, and Dr. Baker.

THIRD DAY—*Thursday, September 20th.*

Morning Session.—14. "The Importance of the Microscope in the Treatment of Sterility in Women," by Dr. H. Marion-Sims, of New York.

Discussed by Dr. Barker, Dr. Skene, Dr. H. P. C. Wilson, Dr. Johnstone, The President, and Dr. Kollock.

15. "Pregnancy as a Complication in Pelvic Diseases," by Dr. James B. Hunter, of New York.

Discussed by Dr. Skene, Dr. Bache Emmet, and Prof. Cameron, of Montreal.

16. "The Influence of Galvano-therapy upon Gynecic Surgery," by Dr. George J. Engelmann, of St. Louis.

Discussed by Dr. Wilson, Dr. Graily Hewett, and Dr. Parish.

Afternoon Session.

17. "Case and Specimens of Extrauterine Pregnancy," by Dr. M. D. Mann, of Buffalo.

18. "On the Treatment of Extrauterine Pregnancy," by Dr. Joseph E. Janvrin, of New York.

19. "On the Early Diagnosis of Tubal Pregnancy, and its Treatment by Electricity, with a Report of two successful Cases," by Dr. H. T. Hanks, of New York.

The last three papers were discussed together, by Dr. Harvey, of Calcutta; Dr. Reeve, Dr. Gordon, Dr. Johnstone, Dr. Kollock, Dr. Engelmann, Dr. Wylie, Dr. Cole, Dr. Dudley, Dr. Mann, Dr. Janvrin, and Dr. Hanks.

The Treasurer gave notice that at the next annual meeting he would move the reduction of the annual dues from $25 to $15 per annum.

Dr. Reeve reported that the Auditing Committee had examined all the accounts and vouchers of the Treasurer and found them correct, with a balance on hand of $443.05.

Papers on the programme and numbered 3, 4, 14, 15, 22, and 25 were read by title and will appear in the *Transactions;* also a paper sent by Professor Alexander Russell Simpson, of Edinburgh, and one by Dr. C. Kollock, of South Carolina.

The President then spoke as follows:

GENTLEMEN: Thirteen years ago, at a period in my professional history when I sorely needed a friend and trusty counsellor, the American Gynecological Society sought me out upon the frontier and generously stepped forward and took me by the hand. Year by year she has guided and guarded me with the

jealous care of a devoted mother. A year ago she placed upon my brow her jewelled crown, and in my hand her symbolical wand. For all this I have nothing with which to requite her in turn save my poor but hearty thanks.

For a twelvemonth, with bated breath, I have staggered under the weight of official care and responsibility, and now that the end is come, as I eagerly inflate my lungs with a fuller measure of exhilarating oxygen, with the welcome sense of relief comes the higher satisfaction of knowing that I am about to resign my charge to a wiser head and a stronger hand than my own.

My brethren, I bid you hail with one heart and one voice your coming President, Dr. H. P. C. Wilson, of Baltimore, and I invoke for him, in his official career, the same earnest coöperation and support which you have so generously given to me.

Upon motion of the Secretary, the Society then adjourned to meet in Boston on the third Tuesday in September, 1889.

JOSEPH TABER JOHNSON, M.D.,
Secretary.

CONSTITUTION.

I. This Society shall be known as the *American Gynecological Society.*

II. The object of this Society shall be the promotion of knowledge in all that relates to the Diseases of Women and to Obstetrics.

FELLOWS.

III. The Fellows of the Society shall consist of Fellows and Honorary Fellows.

The Fellows shall not exceed one hundred in number.

The Honorary Fellows shall not exceed ten Americans and twenty-five foreign.

Candidates shall be proposed to the Council one month before the first day of meeting by two Fellows, and shall be balloted for at the annual meeting, a list of the names having been sent to every Fellow with the notification of the meeting.

A two-thirds affirmative vote of all the Fellows present shall constitute an election, fifteen Fellows, at least, being present.

No one shall be eligible for active fellowship until he shall have submitted to the Council a paper on some subject connected with Gynecological Science.

HONORARY FELLOWS.

IV. The power of nominating Honorary Fellows shall be vested in the Council.

The election shall take place in the same manner as that of ordinary Fellows.

They shall enjoy all the privileges of other Fellows, but shall not be required to pay any fee, or be allowed to hold any office, or cast any vote.

OFFICERS.

V. The officers of the Society shall be a President, two Vice-Presidents, a Secretary, and a Treasurer, who, with four other Fellows, shall constitute the Council of the Society.

The nomination of all officers shall be made in open session at the business meeting, and the same shall be elected by ballot.

The officers shall enter upon their duties immediately before the adjournment of the meeting at which they were elected, and shall hold office for one year.

Any vacancy occurring between the annual meetings shall be filled temporarily by the action of the Council.

All officers shall be eligible for reëlection.

ANNUAL MEETING.

VI. The annual meeting of the Society shall be held at such time and place as shall be designated by the Society at the previous annual meeting. It shall continue for three days, unless otherwise ordered by a vote of the Society.

AMENDMENTS.

VII. This Constitution may be amended by two-thirds vote of all the Fellows present at an annual meeting, provided that notice of the proposed amendment has been given in writing at the annual meeting next preceding, and the same been printed in the notification of the meeting at which the vote is to be taken.

BY-LAWS.

PRESIDENT AND VICE-PRESIDENTS.

I. The President and Vice-Presidents shall discharge the duties belonging to their respective offices. The President shall be *ex-officio* chairman of the Council.

SECRETARY.

II. The Secretary shall attend and keep a record of all the meetings of the Society and of the Council, of which latter he shall be *ex-officio* clerk.

At each annual meeting he shall announce the names of all who shall have ceased to be Fellows since the last report.

He shall superintend the publication of the *Transactions*, under the direction of the Council.

He shall notify candidates of their election to fellowship.

He shall send notifications of the annual meetings and of the meetings of the Council.

TREASURER.

III. The Treasurer shall receive all moneys due, and pay all debts. He shall render an account thereof at the annual meeting, when an Auditing Committee shall be appointed to report.

COUNCIL.

IV. The Council shall meet as often as the interests of the Society may require.

Five members shall constitute a quorum.

It shall have the management of the affairs of the Society, subject to the action of the Society at its annual meetings.

It shall arrange the order for the reading of papers at the annual meetings.

It shall not have power to make the Society liable for any debts exceeding in total one hundred dollars in the course of any one year, unless specially authorized by a vote of the Society.

It shall have the entire control of the publications of the Society, with the power to reject such papers or discussions as it deems best.

The President, or any three members, may call a meeting, notice of which shall be transmitted to every member two weeks previous to the meeting.

The Council shall determine questions by vote, or—if demanded—by ballot, the President having a casting vote.

The Council shall constitute a Board of Trial for all offences against the Constitution and By-laws, or for conduct unbecoming an honorable physician, and shall have the sole power of moving the expulsion of any Fellow.

ORDER OF BUSINESS.

V. The Order of Business at the annual meetings of the Society shall be as follows:

I. General Meeting at 10 A. M. each day.
   1. Reports of Committees.
   2. Reading of Papers and Discussion of the same.

II. The Business Meeting shall be held at half-past eight o'clock P. M. on the second day of the session, at which only Fellows of the Society shall be present. The Secretary's records shall then be read; the Treasurer's accounts be submitted; the reports of Committees on other than scientific subjects be received; and all miscellaneous business be transacted.

PAPERS, ETC.

VI. The titles of all papers to be read at any annual meeting shall be forwarded to the Secretary not later than two weeks before the first day of the meeting.

No paper shall be read before the Society which has already been printed, or been read before another body.

All papers that may be read before the Society, and accepted for publication, shall become the property of the Society, and their publication shall be under the control of the Council.

QUORUM.

VII. A quorum for business purposes shall be fifteen Fellows.

DECORUM.

VIII. No remarks reflecting upon the personal or professional character of any Fellow shall be in order at the annual meetings, except when introduced by the Council.

ASSESSMENTS.

IX. Every Fellow shall pay in advance the sum of twenty-five dollars annually.

Any Fellow whose subscription shall be more than nine months in arrears shall be reminded of the fact by the Treasurer in writing; in event of payment not being then made, he may, on vote of the Council, be dropped from the Society.

Each Fellow shall pay on admission an initiation fee of twenty-five dollars.

Any Fellow who shall neither attend nor present a paper for three successive years shall, unless he offers an excuse satisfactory to the Society, be dropped from fellowship.

AMENDMENTS.

X. Any of these By-laws may be amended, repealed, or suspended, by a two-thirds vote of the Fellows present at any meeting, *provided* previous notice in writing has been given at the annual meeting immediately preceding the one at which the vote is to be taken.

PAPERS

READ AT THE

THIRTEENTH ANNUAL MEETING

OF THE

AMERICAN GYNECOLOGICAL SOCIETY,

HELD IN THE HALL OF THE

COLUMBIAN UNIVERSITY,

Washington, D. C.,

SEPTEMBER, 18, 19, AND 20, 1888.

THE PRESIDENT'S ANNUAL ADDRESS.

By Robert Battey, M.D.,
Rome, Georgia.

Gentlemen: In March last a communication was addressed to me, signed by well nigh every member of the Society, asking that the place of meeting for the current year be changed from Boston to Washington City. Since our last meeting the several special societies united to form a Congress of American Physicians and Surgeons had arranged for a joint meeting to be held in Washington upon the same days which had already been allotted to our session in Boston. A number of the members of this Society are likewise members of one or another of the special societies uniting in the Congress and were forced to elect which to attend. Many other members of this Society were especially desirous to avail themselves of the opportunity which would be offered at Washington to meet distinguished gentlemen from abroad, as well as the large number from our own country likely to gather in the proposed Congress.

The reasons assigned for the desired change were cogent ones, in the interest of the Society and of its individual members. Upon the other hand, the Society, at its last meeting, in New York, had authoritatively declared that the next meeting should be held in Boston on the 18th, 19th, and 20th of September, 1888.

In the change proposed were involved the rights and privileges of individual members of the Society residing in Boston and Washington respectively. This contingency had been

fully provided for, and the unanimous consent of these members obtained.

I have felt it to be my duty to comply with the expressed wish of the members of the Society; a wish expressed with so near an approach to unanimity as to leave scarcely a dissenting voice. I do not feel called upon to discuss the question of the power of the President of the Society, under our Constitution, to change the time or place of our meetings. The American Gynecological Society is an organization avowedly formed for the cultivation of science only. Medical politics do not enter at all into its plan or purposes. This is no field for the exercise of the skill of the parliamentary tactician or the political wire-worker. The prime object in the adoption of our Constitution and By-laws was to lubricate the wheels of scientific progress, not to clog and hinder their movements.

Our annual meetings take place in the larger cities of the country. The unlooked-for occurrence of a prevailing epidemic of disease might, in any year, threaten the success of a meeting of the Society so seriously as to make it expedient to transfer the session for the year to some neighboring city more eligible for the time being. Contingencies are liable to occur any year which may render the time fixed for a meeting an undesirable one, and a change to some other date might greatly promote the objects for which we assemble.

There seems to be no good and sufficient reason why the Society should be so hampered as to be denied the privilege of availing itself of a simple remedy for such untoward contingencies which might stand in the way of its useful work.

It is not, in my opinion, at all necessary that a change in our Constitution should be made in order to effect the purpose in view. It would be difficult to devise a safer and better method of accomplishing the purpose than the one adopted in the present instance. So long as the President but speaks the voice of the whole Society in such matters there can be no room for abuse of the power which he exercises. The fact

that the power which he invokes is an extraordinary one will, in itself, naturally lead the one exercising it to due care that he shall represent the sentiment of the whole membership and not of a bare majority.

The action taken in this instance is not without a precedent in our own proceedings. For, at our second annual meeting held in Boston, and with the same constitutional restrictions we now have, it was decided to hold the next meeting of the Society in the city of Philadelphia on the 11th, 12th, and 13th of September, 1878. Subsequently, for good and sufficient reasons, and by a method similar to the one adopted in this instance, the time of the meeting was changed to September 25th, 26th, and 27th of that year.

Our Vacant Chairs.

Under the Constitution of this Society, adopted at its organization in 1876, the active membership in the Society was limited to sixty. At the sixth annual meeting, held in 1881, an effort was made to increase the limit of active Fellows from sixty to one hundred, but the effort failed. In 1884 another attempt was made and the Constitution so amended as to extend the limit to one hundred active Fellows.

In looking over the roll it appears that the original restriction of membership to sixty has not yet been reached in the history of the Society, fifty-eight being the highest number as yet recorded in our annual volume of *Transactions*. The original design in thus restricting our number to sixty was to confine the body to a comparatively small number of active and diligent workers, who would be able to scan and criticise intelligently the papers offered and discuss their merits more satisfactorily than would be possible in a large body of a more miscellaneous character.

That this position was well taken at the outset is, I think, amply attested by the tables of contents of the twelve volumes of *Transactions* which have thus far been issued, coupled with

the notable fact that these volumes are eagerly sought for at the booksellers and in our public libraries, and so often quoted as authority by standard writers in Europe as well as in our own country.

During the twelve years of our corporate existence the number of our members has increased from thirty-nine to fifty-eight, and the average annual number for the twelve years has been fifty-one. The records show that the number of active Fellows in attendance upon our annual meetings has varied from nineteen to forty-four, and the average of the twelve years has been twenty-nine.

When we consider the fact that our active fellowship is made up chiefly of busy specialists in large and lucrative practice in the great business centres of our widely extended continent, who must necessarily make great professional and pecuniary sacrifices in order to be present at our meetings, an average attendance of twenty-nine out of an average membership of fifty-one must be regarded as quite creditable to the interest and zeal of our Fellows.

Pushing this investigation a little further, I find that there has been present at the three meetings held in New York no less than seventy per cent. of our Fellows; at the two meetings in the city of Philadelphia sixty-five per cent.; at two meetings in Baltimore fifty-eight per cent.; at two meetings in Boston fifty per cent.; at one meeting in Washington forty-three per cent.; at one meeting in Chicago forty-one per cent.; and at one meeting in Cincinnati thirty-nine per cent. These figures not only show the wisdom of the policy heretofore pursued, of holding our sessions chiefly in the great centres upon our eastern border, but they also show strikingly the interest felt by our Fellows in the meetings of the Society. Surely there are very few medical organizations anywhere which can make so good an exhibit in the attendance of their members.

The Society has held its twelve annual sessions, and two of our Fellows now before me enjoy the distinction of having

been present at every one of these meetings. Two others have attended eleven meetings, and three have been present at ten of these sessions. But one of our founders (who is now deceased) has failed to register his name at some one of our annual gatherings. But one of our members by election has habitually absented himself, and in this case the absence has been atoned for in part by voluntary contributions of papers of general interest.

In reviewing the voluntary papers embodied in our *Transactions*, I find that one Fellow has evidenced his devotion to the Society by the presentation of no less than ten such papers, many of them elaborate and scholarly, and all of practical value. Another has contributed nine papers, which have been read and studied upon both Continents. Two Fellows have contributed each eight voluntary papers; two, seven each; three, six each; eight, five each; and eight, four each. Only three of the older Fellows, who have been some years with us, are not down upon the record of voluntary papers, but these have done more or less good work in the discussions of the Society. Our record in this regard is one we may point to as being not only satisfactory but the subject of mutual congratulation.

Faithful and excellent as the work of this body has certainly been in the past, and untiring as we may be in the present, there comes a time to all men when the brain as well as the hand tires of exertion and must have rest. A time when the machinery by reason of age upon the one hand, or of overtasking its powers upon the other, becomes so worn and rickety as no longer to be useful for effective exertion. We must look to the younger and stronger men in the profession to replace, year by year, the weary and the worn in this work. Surely our resources for recruiting our ranks are not wanting.

In the past America has been, in a sense, the home of gynecology. To-day no country can boast of so large a number of intelligent workers in this department of the healing art. In

our vast country the number of medical practitioners who devote themselves exclusively to gynecology is quite large, whilst those who make it a leading pursuit are to be counted by thousands. Surely out of this army of gynecological specialists one hundred men can be found who might worthily occupy places as working Fellows in this Society. Why is it, then, our seats remain year by year scarcely more than half filled?

Whatever may be the true answer to this question, it can be safely asserted that membership in this Society is not undesirable. Of those already in our ranks it may be said, in general terms, as has been mournfully alleged of federal office-holders, "few die and none resign." In our own country there is no society whose certificate of membership carries with it so strong a presumption of professional qualifications. There is none whose Fellowship is so sure a passport to professional recognition in foreign lands.

When I say to you in all sincerity, if I were to-day outside, instead of inside, the ranks, my self-distrust would forever bar me from becoming an applicant at your doors except upon special invitation, I can but feel that I am verging toward the true explanation of our forty-two vacant chairs. Diligent workers in medical science are, with an occasional exception which but proves the rule, modest gentlemen, not at all inclined to push themselves where they are not wanted. It is this class of members which we especially desire, and it is this class, too, who are least likely to make application for the Fellowship without some advance on our part which would give probable assurance of welcome.

The vacancies in our membership might be filled by either of two methods, namely, first, by opening a wider door and lowering the standard of qualifications in candidates; secondly, in some proper and delicate way to invite applications for the Fellowship. To adopt the former method would involve a confession of weakness in our plan of organization which the

facts of our past history clearly disprove. Such a proposal would meet with vigorous and well-deserved opposition, and it may well be dismissed from our consideration as an expedient not to be thought of in this Society.

The Society, exercising as it does the absolute right to demand of applicants for its Fellowship evidence of their qualifications for our special work, and sitting in judgment upon the sufficiency of the evidences offered, could not with any propriety invite gentlemen to submit themselves to its censorship. But it is worthy of inquiry whether the individual Fellows residing in the different States might not take this matter in hand with advantage. Could they not confer together and make judicious selections of candidates from their States? Might they not in their individual capacity in proper terms encourage such persons to become applicants for Fellowship without the giving of any definite pledges or assuming any undue responsibility? Might they not look over the profession of any adjoining States, in which we have no Fellows, and make judicious selections? Might they not go still further, and consider the fitness of gentlemen residing in States where we already have active Fellows, and suggest by private correspondence and in proper way their opinion of the fitness of such persons, leaving to their own immediate neighbors, who know them best, the decision of the questions raised?

To render this method of filling our ranks effective, it is necessary that we fully realize the advantages of increasing our numbers. If we fail to do this, it were better that we return again to our original limitation of sixty. If it is really our desire to extend our numbers to one hundred, we have only to manifest that desire by a little diligent work and the purpose will soon be accomplished. Ought we not to be taking steps in this direction without further delay?

Have we a Statute of Limitations in Medicine and Surgery?

From an early period in the history of the world civil governments have been accustomed to recognize certain rights in newly discovered territory based upon the fact of discovery. Property rights, too, have been accorded freely to those who have acquired them by conquest either by driving from unimproved lands barbarous tribes by force of arms, or in the more peaceful methods of the husbandman by felling the primitive forest and subduing the rank soil by use of the plough, into productive fields for the supply of human wants.

In the progress of civilization, too, it has grown to a custom to recognize in discoverers and inventors certain property-rights in the results of their ingenuity and enterprise. In order to avail one's self of these governmental grants and privileges, it is everywhere required that the claimant shall give early and proper notice to the public of his claim, accompanied by such specifications as will clearly set forth its nature and extent. Failing to give such notice and file such specifications within reasonable time, the claimant is barred by certain laws enacted for the protection of interested parties, as well as the people in general, and known as statutes of limitations.

Our statutes of limitation in cases of debt are based upon the old English statute, which limited the creditor to six years in which to assert his rights, and the debtor to a like period for the preservation of his evidences of payment. These laws are based upon the legal presumption that debts which have remained unclaimed for six years have either been paid, or have ceased to have binding force by reason of indifference and neglect on the part of the creditor.

In the case of claims by title for land the period has been lengthened to twenty years, but this privilege is restricted to written evidences of title which have been duly signed, sealed,

and delivered, and officially recorded, thus giving due notice to the public at large. In the absence of such record and public notice the exclusive title of the claimant is, in general, restricted to the short space of one year. It would be a hardship indeed to allow a claimant for land to hold his titles in secret for an unlimited number of years, whilst the party in possession is expending his labor and his money without stint in the improvement of the estate, and with the purpose of building up a property for the future enjoyment of himself and his posterity.

Our statutes of limitations, too, are traceable far beyond the English common law to a Divine origin; for in the earlier periods of biblical history we find that the services of a bondsman were limited by the Mosaic law to the space of six years.

A claim by title based upon the right of discovery of new territory made by a government officer, commanding a government vessel, fitted out and manned at public expense for the purpose, is everywhere disallowed. Whilst it is customary to grant some gratuity in lands, in money, or in honors to the discoverer, the right and title to the newly acquired possessions vest in the Crown or in the government fitting out the expedition.

In medicine individual members of the profession receive freely and without price their outfit for life's work from the common stock of human knowledge. They are under solemn obligations to use it for the common good, and to add something, in their day and generation, to the accumulated fund from which they themselves have freely drawn. Discoveries and inventions which they may make in the use of this common fund vest no exclusive title in them to such advancements. They may justly claim credit for their labor and proper recognition of their merits as discoverers, but the right and title to the things discovered vest not in them but in the medical profession itself, which has furnished them from its storehouse of centuries the tools and the outfit with which they labor.

When such discoverers conceal from the world for years the things discovered, do they not thereby forfeit all claim to recognition and forever bar themselves under a statute of limitations? When they persistently neglect to bring their discoveries before the profession, do they not as effectually bar themselves under the statute by reason of such indifference and neglect?

A traveller discovers by the wayside a pretty pebble. He picks it up, admires its translucency for a time, and throws it down. Another traveller, treading in his footsteps, picks up the same pebble, and seeing beneath its rough exterior the sparkle of a true diamond, proceeds to have it cut and set for use. To which of the discoverers belongs the precious gem? One discovers a naked fact, and contenting himself with the empty discovery holds his peace. Another makes the same discovery, and recognizing its great value puts it to use, and presses home upon the profession the recognition of the importance and value of the new addition to human knowledge or to the resources of human art. Which, think you, is the real discoverer? Is not the former effectually barred by reason of his failure to apprehend the true value of the thing discovered and to press it to its full recognition and general use?

If the discoverer of a new fact or process should write and publish a book covering the subject embraced in his discovery, it would naturally be expected that he would avail himself of so fitting an opportunity to bring his discovery before the medical world. This would be especially natural and proper if his discovery were of so important character as to be likely to prove of infinite service to suffering women. It may safely be assumed that most authors would even go so far as to stop the press, whilst the book was in progress, in order to herald to the world the news of so valuable a discovery. Under such circumstances the exhibition of personal modesty or self-abnegation which would lead the discoverer to content himself with discussing the principles only, refraining from all mention of his own important original work,

whilst another claimant might perhaps be actively proclaiming it from the housetop, would be so extraordinary as to call for the fullest explanation. Would not such astonishing self-denial put the case fairly within the statute of limitation?

In former times, before the organization of the numerous medical societies which now exist in every civilized land, and when the medical journal was unknown, there was excuse for failure to bring one's original work and discoveries promptly before the medical world. Now the facilities for communicating such information are widespread and ample. Pioneers are not only offered abundant opportunities to communicate with the profession, but they are often urged and importuned to do so by the enterprise of medical journalists and the officers of medical societies. One who in this day locks up in his own bosom, and for years, the knowledge of a valuable discovery may well be asked if he has not forfeited all claim, under a statute of limitation, by reason of his concealment or neglect?

It is a poor student of human nature who has not learned that the record of the diagnosis of a case honestly entered in the case-book at the outset, reads very differently from one which is written down from memory after the autopsy has been held. It is always easier to look backward than forward in such matters. If one may be allowed to go back for years and bring forth cases from his note-book, or from the prolific storehouse of memory, and put his own matured interpretation upon them, the road to fame would become a highway of easy ascent.

A quaint Southern humorist (Bill Arp), in his rural phraseology, gives utterance to a homely truth when he says, "If our foresights were only equal to our hindsights, we would do many things differently." In a contest for priority between two claimants, if one is restricted to the use of his "foresights" only, whilst the other is allowed to bring into play his "hindsights" also, the result of such unequal strife would seldom be doubtful.

Medical men are presumed to be honorable gentlemen whose word is a bond. In general, we may safely trust them to record their cases accurately, whilst fresh in mind, and accept their statements with confidence. When, however, years have gone by, man in his best estate is but human, memory is treacherous and uncertain. He who rests himself upon it with greatest confidence is by no means the one most to be trusted for his accuracy of statement. Honest and truthful men are, in general, accustomed to watch themselves most closely.

It may pertinently be asked, is the *ipse dixit* of an operator, after the lapse of years, to be accepted as conclusive proof of the authenticity of his cases? Is the testimony of patients themselves satisfactory evidence of work done within the abdomen whilst they were under the influence of an anæsthetic years before? Do such assertions throw upon the medical profession at large the onus of proof that such operations were not done in manner and time as stated? It may safely be answered that the medical world recognizes no such obligation, but leaves to claimants, themselves, the task of authenticating their own cases, and of fully and clearly substantiating their own claims.

To allow such latitude to claimants would be but to open a wide door to untruthful and dishonest persons, if, indeed, any such could be supposed to have gained admission to the ranks of a high and noble profession, through which they might find ample room to bring in cases specially cooked for the occasion and present them unsupported by other testimony save the mere assertion of the operator. What honest man could stand against such fearful odds?

With the ample facilities which we now have for bringing new discoveries to the notice of the profession through medical societies and medical periodicals, does not an obligation rest upon all pioneers to avail themselves early of such opportunities to put their claims upon record? Does not a failure to do this justify the presumption either of a lack of proper appreciation of the value of the thing discovered or a culpable indif-

ference and negligence? After a reasonable period has elapsed is it not just and equitable to exclude all such lapsed claims from further consideration?

A careful review of the subject which I have thus briefly and imperfectly presented, has led me to the conclusion that there is need for a statute of limitation in medicine and surgery to define the rights of contesting claimants, and to protect the true discoverer against the cunningly devised schemes of any false one. In the minds of honorable gentlemen of the medical profession the world over, this want is not unsupplied. There *is* an unwritten statute of limitation of full and binding force in every civilized land and wherever medicine as a science is recognized and cultivated. This statute requires that early and ample notice shall be publicly given of all claims to new discoveries and inventions, accompanied by such reported particulars as shall clearly define the nature and extent of the claim. It requires that the claimant shall deal frankly and honestly with the profession, withholding nothing and making no misrepresentations. It requires that the claimant shall clearly recognize the value of his discovery, and diligently urge it upon the attention and recognition of the profession. It requires that all this shall be done within a reasonable, but as yet not definitely fixed, period of time. For a failure to comply with these reasonable requirements the statute provides a penalty also, and declares such delinquent claimants to be forever barred.

PALPATION OF THE URETERS IN THE FEMALE.

By Howard A. Kelly, M.D.,
Philadelphia.

By palpation of the ureters the gynecologist has at his command a new and valuable adjuvant in the correct diagnosis of renal and bladder diseases and their sequelæ, as well as the possibility of recognizing intrinsic diseases of the ureters hitherto only discovered on the post-mortem table. Such is the specialization of specialties, that I have been asked by surgeons if the ureters are prone to disease of any sort or variety. It is but necessary to consult the works of Rayer, Cruveilhier, and others on renal diseases, and especially the plates of the former, to recognize at once the extent to which the ureters are often associated with the kidneys, participating in processes of inflammation, ulceration, and tuberculosis. Here invariably the ureteral disease is secondary, descending, and the condition of the ureters discovered by a vaginal examination may be the first clear point in determining the nature of the disease above, and the only possible means, short of operation, of determining on which side the disease exists. Again, inflammatory diseases of the bladder, particularly gonorrhœal, often have a fatal tendency to travel upward, resulting in pyelitis and pyelo-nephritis. Here the affection of the ureter invariably precedes that of its pelvis and the kidney, and may at once put a careful observer on his guard as to possible consequences, even of an apparently mild inflammation. Calculus resting in the pelvis of the kidney or lodged in the ureter, occasions an inflammatory condition of the whole of the tract below, easily distinguished by palpation.

When we recall the immense quantities of excrement discharged daily through these delicate tubes, from two organs absolutely essential to life, one or other of which may be diseased, or both in different degrees, and associate with this the anatomical relation of the pelvic portion of the ureter in the female, placing it within easy reach of the examining finger, we see at once the importance of a careful routine consideration of their condition and function in every case coming under observation. It is but necessary to bear in mind the cases of hydro-nephrosis which have been caused by pressure of uterine tumors, ovarian tumors, retroflexion, and even prolapsus uteri, and the constriction of parametric scars, caused also in one case by a retroperitoneal sarcoma observed by the writer, and to remember the possible effects of pressure by the gravid uterus, as well as the large number of cases of carcinoma uteri which die of uræmic coma, from involvement and obstruction of the ureters, not to cite cases in which the ureters have been tied in enucleating the cancerous uterus per vaginam, as communicated to me by Dr. H. C. Coe, and observed by others, as well as cases in which a ureter has been cut in opening a pelvic abscess, to realize the clinical importance of ureteral pathology. I may also here mention the fatal results which have followed the neglect of Dr. Emmet's precaution, in the operation of vesico-vaginal fistule, of rolling out the edges and hunting for the ureteral orifices, a neglect which has in many instances resulted in death and in more in a failure in the operation. This brief statement of the important facts serves to show how extended a field is here open for the gynecologist, connecting him often with practical medicine, just as the abdominal surgery of to-day closely links his work with that of the general surgeon. In fact, with a more careful study of bladder troubles, now the *bête noir* of gynecology, with a differentiation of bladder and ureteral diseases up to this time impossible, and with an association of a careful study of renal diseases as connected with or to be disassociated from the last, a new realm seems to be opening to the scientific gynecologist.

Methods of Examination.—The ureters can be examined in several ways:

By inspection.

By catheterization.

By palpation, or by either or all three methods combined.

Inspection is the method proposed by Dr. T. Emmet, and is conducted by splitting the vesico-vaginal septum and everting the edges of the wound until the ureteral orifices are exposed, when the ureters may also be catheterized, and their secretions compared. This method resembles the practice of introducing a catheter into the exposed orifices of the ureters in the margin of a vesico-vaginal fistule. It is one of value in serious cases warranting operative interference; nor is the operation, skilfully conducted, to be estimated as in any way grave. The edges of the incisions can be brought together after the examination and the wound healed at once. Grünfeld attempted to reach the same result by means of a catheter attached to an endoscope, introduced per urethram and carried thus into the ureter under control of the eye, while G. Simon gave great impulse to the whole subject of catheterization by his well-known paper, "Ueber die Sondirung des Harnleiters beim Weibe." His method, in brief, was to cut the tight external orifice of the urethra, to dilate the canal by a series of plugs, slowly and carefully introduced, until it would admit the index finger (his finger measured almost six centimetres in circumference), which sought out the little ureteral prominence in the bladder, and thus guided a catheter or sound introduced alongside the finger into the ureter. This method I have practised for the sake of estimating its value. It is too circumstantial to be of any general applicability, and, owing to the varying sizes of index fingers, one of considerable danger;

in addition to which is the fact that in the very cases it is most desirable to catheterize, the ureteral orifices are often most difficult or even impossible to find. The method of Prof. Karl Pawlik, of Prag, of catheterizing the ureters free-handed, without preliminary preparation of the patient, beyond the occasional distention of the bladder with a bland fluid, is the one deserving most attention. This method I have both practised and seen at the hands of Prof. Pawlik during the past summer. The patient is placed in the dorsal position, with legs strongly flexed on the abdomen, and a Simon or Sims's speculum introduced retracting the posterior vaginal wall. The eye at once observes a series of divergent folds starting just back of the neck of the bladder and sweeping laterally and back toward the cervix uteri, corresponding very closely at their point of union to the inter-ureteric ligament, and following in general outline the course of the ureters. A delicate catheter, of which the cut is here shown, loaned me by Prof. Pawlik, or one similar to that exhibited here, which I have used myself, is then carried into the bladder, distended with about four ounces of urine, and poised between thumb and index finger. The position of the end of the catheter is plainly noted by the eye observing its movements in the vagina as the point sweeps gently along the floor of the bladder. The ureteral orifice is to be sought for about an inch back of the neck of the bladder, and about a half or three-quarters of an inch from the median line on either side. This position of the ureter, however, is not constant, and cannot be relied upon alone. Far more characteristic is the slight tripping sensation given to the point of the catheter as it glides over the ureteral prominence. As soon as this sensation is perceived, the catheter must be at once brought back to the place where it was felt, and gentle attempts made to engage its point by repeatedly carrying the handle upward and outward, and the point consequently in the opposite direction. Once caught, the catheter sweeps readily in, and if lightly held directs its own course, the fingers simply following. It thus passes some distance un-

restrainedly, parallel to the pelvic wall, and the eye observes the anterior vaginal wall being lifted up in advance and to one side of the cervix, forming a distinct pocket on the side on which the ureter is catheterized. This is a point to which my attention was specially called by Prof. Pawlik.

On withdrawing the stopper in the end of the catheter, a few drops of urine run out, when the flow ceases; after a few seconds a few more drops run out and then cease, keeping up in this way an intermittent discharge entirely characteristic. The catheter cannot with safety be pushed beyond the brim of the pelvis. On withdrawing it the sudden drop of the anterior vaginal wall is very characteristic. I have found, as Pawlik states, that very slight force in the cadaver is apt to make false pockets in the mucosa of the bladder. This was especially marked in a subject upon which I experimented this summer in Prof. Virchow's laboratory. The ureters were displaced backward to an extreme degree, and, in spite of the fact that I knew exactly where they were, and the catheter would constantly glide over the orifices, it was almost impossible to introduce it. I have at other times succeeded in introducing it at the very first attempt, and yesterday morning in my office catheterized the right ureter of a patient who did not know that I was doing more than making an ordinary vaginal examination. I have made a change in Pawlik's catheter, substituting a series of holes for the long fenestrum, which caught and cut the mucous membrane of the urethra in introducing it into the bladder.

Palpation of the Ureters.

Since a visit made to Dr. M. Sänger, of Leipzig, in 1886, when he demonstrated the possibility and the practicability of palpating the female ureters in their lower pelvic portion, it has been my routine practice to examine the ureters in all gynecological cases coming to me for treatment, and in my case-book I have a printed form, in which any deviation from the normal is noted under the heading "ureters." When

there is no disease, both ureters can usually be felt with facility, as more or less flat cords about three millimetres in diameter, movable to an extent of one or two centimetres, in the loose pelvic connective tissue. One or both hands may be used in palpating, the right hand inside most readily finding the right, and the left hand the left ureter.

METHOD.—The finger is passed into the vagina behind the internal orifice of the urethra, at the end of the rugose promontory on the anterior vaginal wall, and carried with some exertion up toward the brim of the pelvis, displacing the vaginal wall upward and outward until the pulp of the finger reaches the highest point it can touch, often as high as the brim, but varying according to the greater or less laxity of the tissues and their fixation by pelvic pathological processes. It is then carried downward, stroking the pelvic wall, carefully estimating the character of all structures felt rolling under it. As soon as the observer thinks he has felt a ureter, he catches the cord again with the hooked finger and pulls it down a little, and then slides the finger first toward the bladder, where the ureter is felt to lose itself at the trigonum, and then backward, where it loses itself sweeping around the cervix. I have found that in a certain number of cases the ureter can be felt most distinctly in this position just in advance of the cervix, by placing the patient on her left or right side, when the vagina balloons out and applies itself closely to that side of the pelvic wall which lies undermost; here the ureter can, by a slight effort displacing the vaginal vault upward, be hooked and brought down under the finger, felt with the utmost distinctness, and compressed.

BIMANUAL PALPATION.—I found after examining a certain number of cases in which it was impossible to displace the vagina sufficiently to feel the ureter against the pelvic wall, or to feel the ureter with one hand lying like a cord in the connective tissue alongside the vagina, it was still possible to outline its whole course with distinctness by a bimanual examination, when it could be picked up between the tips of two fingers,

and traced from cervix to bladder. In speaking of this to Dr. Sänger this summer, he called my attention to the fact that he had mentioned the bimanual examination, and stated that he was daily more fully appreciating its possibilities. The best position to feel for the ureters at the beginning of the bimanual examination is in the oblique diameters of the pelvis, bringing the tips of the fingers as closely as possible together, and rolling them to and fro, keeping near the pelvic wall, watching for the characteristic sensation, when the cord may be traced in either direction. In late pregnancy the ureters are especially distinct, and seem often to be enlarged. Under favorable circumstances, a thickened ureter can be felt through thin abdominal walls as it leaves the pelvis and crosses the brim.

The following brief notes are a series of cases from a general gynecological practice in which I jotted down in my case-book a statement as to the condition of one or other ureter :

S. D. Chronic gonorrhœa. Left ureter distinctly felt as a tense painful cord, exciting ardor urinæ on pressure.

M. R. Five months pregnant; ureter distinctly enlarged, felt best close to cervix.

M. G. Prolapsus uteri. Ureters felt in dorsal position; in left lateral position left ureter distinctly felt after crowding vagina high up and hooking it down on finger; obturator artery felt parallel to course of ureter.

M. W., very stout woman. Ureters felt with difficulty in the dorsal position; fibres of obturator muscle easily to be mistaken for ureter; in semiprone position, left ureter brought down and felt with ease.

M. D. Appendages removed; left ureter not felt, owing to fixation of vaginal wall on that side; right felt with ease. Illegitimate pregnancy, three months. Ureters not enlarged, felt distinctly, best bimanually, in loose connective tissue.

M. G. Severe ardor urinæ; cannot feel ureter; mistook sharp border of obturator foramen for ureter.

M. F. Cannot feel ureter with unaided vaginal hand; bimanu-

ally felt distinctly in loose connective tissue at a distance of four centimetres behind pubis, and traced around toward cervix.

M. C., three months pregnant; ureter only to be felt bimanually, not enlarged, but distinct, and cord-like.

M. McC. Ureter felt distinctly in left lateral position; not felt in dorsal position.

M. C. Ureters felt doubtfully; sharp line of fascial origin of levator ani readily taken for a ureter.

M. A. Dorsal posture, ureter felt as large as little finger, exquisitely sensitive; not so well felt in lateral posture.

E. S. Ureters distinct, firm cords from bladder to cervix; desire to urinate on pressing on them.

M. U. Gonorrhœal cystitis. Right ureter sensitive.

M. O. Large and stout woman. Ureters felt doubtfully.

M. T. Ureters flat bands; parallel to origin of levator fibres and obturator artery.

M. P. Bright's disease. Retroflexion; ureters remarkably distinct, cord-like.

M. S. Puerperal fever. Left ureter very large and distinct.

M. R. Left ureter felt by hooking finger up and under left pubic bone; it cannot, however, be pressed against the pelvic wall; felt more distinctly bimanually with the left forefinger close to the left side of the cervix, and the right hand meeting it through the abdominal wall; the tissues glide from under the hands as they are brought forward until the ureter slips like a tense whip-cord; this lies at least one and a half centimetres from and parallel to the pelvic wall in the connective tissue.

M. A. Ureter felt distinctly as it courses high up under the upper margin of the obturator foramen, and then sweeps down toward the cervix.

M. G. Ureters distinct throughout their course; particularly distinct in fornix by cervix.

F. B. Left ureter as large as quill; very tender, and produces intense desire to urinate on pressure.

M. McF., ten months pregnant; left ureter large as goose-quill.

The ureter must be felt distinctly and its course traced, to determine with certainty its identity. It may be mistaken for the obturator artery, the obturator nerve, which is some-

times very distinctly felt, the upper margin of the obturator foramen, the line of origin of the levator ani muscle, bundles of fibres of these muscles, notwithstanding their different course, and bundles of connective tissue. While the ureters cannot be discovered in all cases, with perseverance and practice a marvellous facility will be developed for their detection. With this brief summary of the methods of examination, particularly of palpation of the ureters in the ordinary cases as they mount the gynecological table, I will close by citing four cases in which the patients had been sufferers for years from disease of the ureters, and under the most varied kinds of treatment for bladder and uterine diseases which never existed. Two had had severe operations upon the bladder for cystitis; in all, I found nothing more than an inflammatory condition of the pelvic ends of the ureters—a *ureteritis*.

Case I. *Ureteritis.*—Mrs. W. came to me in 1886, aged twenty-eight years; has had two children, six and four years ago. First labor instrumental; second natural and easy. Recovery after last rapid, until three weeks post-partum, when she lifted a heavy wash-boiler from the stove to the floor. She felt something snap inside, and was unable to straighten herself, feeling at once an intense desire to urinate; she managed to crawl to the closet, where she remained some hours straining in a vain effort to pass water. She succeeded finally in forcing out only a few drops. Since that time, four years ago, she has never urinated easily, but has remained a confirmed invalid, suffering from a constant ardor urinæ, which it is impossible to quench, and a dribbling which keeps her person wet and odorous, rendering it impossible for her to assume the care of any duties, beyond the constant necessary attention to her person. She had been treated continuously ever since the accident for various bladder diseases. I found the bladder perfectly free from disease, and after removing a large dermoid cyst, performed Dr. Emmet's buttonhole operation, under the false impression that the trouble might be due to some traction at the neck of the bladder, teasing it. Shortly after this I discovered that the whole difficulty lay in the ureters, that both ureters

were enlarged to the thickness of my little finger and exquisitely tender. The least impression made her cry out with pain and an irresistible desire to urinate, which she did upon my examining hand. The course of the ureters was similar to that of the normal, sweeping in a well-marked curve from the base of the bladder, behind the pubis, outward to the pelvic wall, skirting this in a gentle curve downward to the cervix uteri, behind which they rose to disappear from the examining finger.

Case II. *Ureteritis.*—Sarah McK., aged twenty-eight years, single, virgin; was regular in all her functions until nine years ago, while in Ireland, at work on a hand-loom, when she began to have a desire to go more frequently to urinate. For a year this continued, growing worse, until the desire became almost constant. This continued eight years without pain, during which time she had taken work as a waitress. She then began having pains down the bladder, which she described as "jagging." She was obliged at this time to rise three or four times in the night, at well as to go almost incessantly throughout the day. From this beginning the pain has always continued, increasing in severity, until it has finally assumed a darting, stabbing character, seeming to travel from the vagina upward. Besides these pains she had at intervals throughout the day distressing bearing-down feelings in the lower part of the abdomen. For five years she has never been a half hour on her feet without urinating; her greatest distress is in the left ovarian region; the only relief experienced is for three or four minutes after passing water; latterly she cannot sleep more than half an hour without being called by a painful desire to micturate. She is pale and worn, with an anxious expression, and describes herself as utterly wretched. I found the urine clear, at times cloudy, but no evidence whatever of disease of the bladder; the left ureter was felt at a point three-quarters of an inch below the sharp upper margin of the pubic origin of the adductor, as she lay on her back, as a large, hard cord, so sensitive that she cried out on the least pressure; this grew larger and irregular in size as it swept around toward the cervix to lose itself behind the retroposed uterus. In this position, beside the cervix, the ureter was so large and tender, and so distinct to palpation, that it was mistaken at first for an enlarged tender ovary. I opened the base

of the bladder a year ago, securing perfect relief; and she so much fears a return of the old symptoms that she prefers the discomforts of the fistule, and will not yet let me close it.

Case III. *Ureteritis.*—Mrs. C. is a mother of four children, the youngest six months old; her husband had gonorrhœa before marriage, but states he was well when married. When three months pregnant with her second child she had a violent cystitis, passing blood and pus from the bladder. A doctor dilated the urethra by introducing the finger, and since that time, in addition to her constant suffering, she has been unable to control her urine, which runs from her, soaking the bed to which she is confined. I find now no signs of any disease of the bladder, but on either side a ureter as large as a goose-quill, hard, and so tender to the touch that they cannot be thoroughly examined without an anæsthetic; the uterus is retroposed.

Case IV.—Mrs. H., a widow, aged forty years, came to me in 1886 with a statement that she had been for eleven years a sufferer from inflammation of the bladder. During the day she urinated every fifteen minutes to every half hour, and at night arose every hour. She had a haggard expression, and a transparent, waxy skin. She suffered constantly from a burning sensation in the lower abdomen, which was frequently aggravated by the great ease with which she took cold; she was always worse at the menstrual period. She had chills, which were followed by pains all through the lower part of the abdomen, after which the urine would, at times, stop flowing for several hours, and she felt as if the "channel from the kidney to the bladder was closed." At this time she would be consumed with a high fever, and a burning extending into the left hip bone; she suffered at the same time from palpitation and dyspnœa. Gradually under pressure of severe straining she would be able to pass a little urine by gushes and driblets, when the attack would wear off. I found the urine with a sediment, containing no pus and no albumen. The uterus lay retroposed, as in the other cases; resting in the sacral hollow, as if sitting in a rocking chair. The cervix lay one inch behind the pubis, and halfway between cervix and pubis on the left is the large, exquisitely tender ureter, moderately movable as it lies in the loose connective tissue of

the pelvis. Urine flows in gushes during the examination, as the desire on touching the ureters is so great she cannot control it.

I performed the operation of hysterorrhaphy upon this patient, hoping that by taking the twist out of the tissue surrounding the cervix and by lifting the uterus up, a possible mechanical cause of the ureteral obstruction would be removed. Her condition after four months is marked improvement in the number of times she is obliged to urinate, especially at night, and considerable general improvement, but no change in the condition of the ureters as determined by vaginal touch.

I have purposely refrained from attempting more in these cases than to point out the fact that many cases being treated for functional disease, irritable bladder, or even cystitis, are purely and simply diseased ureters, which can readily be detected by vaginal touch.

DISCUSSION.

Dr. William M. Polk, of New York.—This entire question, Mr. President, is one of great interest to us, and I recognize that there is great difficulty in reaching the regions that are involved. This is very clearly shown by the long while that has elapsed between the former methods and the work that is now before us. I think as far back as 1875, or before that—I think the case of Dr. Emmet was before that—our attention was drawn to the importance of treating and sounding the ureter; and before that, even by Simon in his work. The slow progress which has been made in the direction of treating the ureter and the pelvis of the kidney, is undoubtedly due to the great difficulty which we meet with in getting at it. The method which Dr. Kelly speaks of, which is Pawlik's, as he says, is the one I experimented with very thoroughly some five years ago, and I recognized all of the points which were laid down by Pawlik as being necessary for the protection of the ureter at that time. But I confess that I did not always get very satisfactory evidences of my success in reaching the ureters in that way, so that I after a while adopted Dr. Emmet's suggestion, which was to make a buttonhole in the

bladder and then, guided by the finger, to make the necessary catheterization, and I will say that that is practically the position I have maintained toward the catheterization of the ureter up to the present time. Dr. Kelly's case will induce me to take up the subject again and see if I cannot obtain the results he has obtained.

So far as recognizing the diseased ureter where it is hidden —that is comparatively easy. I think that Dr. Kelly's drawings, as regards palpating for it between the bladder and vaginal wall, are clear. Palpating for it between the line of the uterus and the brim of the pelvis is better done by the rectum, and I have frequently been able to detect a distended ureter in that way and to bring a slight pressure to bear upon the tube.

My own work in the direction of detecting an obstructed ureter for the purpose of getting out urine so as to enable us to distinguish urine that flows from a diseased kidney and that which flows from a healthy kidney, was laid before you some years ago. I confess that while I had no difficulty in compressing the ureter between instruments placed in the bladder on the one hand, and in the rectum on the other hand, yet the difficulty was in maintaining that pressure sufficiently long to gain a practical result. You can unquestionably catch the ureter between its vesical extremity and the line of the uterine arteries —you can unquestionably catch the ureter between instruments if they are properly shaped, one in the bladder and the other in the rectum. The only thing necessary is that the instruments shall have the proper curvature, and the nearest approach I can give is to recall to your mind the old catheters that were employed in the catheterization of the enlarged bladder. You recall what a large curve they had ; I had some modified to give a shaft that ran off from the curve at a sharp angle and not continuous with it. That passed in and the continuous side brought in apposition with the vaginal wall, and another instrument being passed into the rectum, the tube could be grasped between the two. The difficulty was in maintaining that pressure sufficiently long to secure a practical result.

The instrument which I devised for the purpose I threw aside. My inclination is toward catheterization of the ureter as giving

the best results, but whether by the method of Pawlik or Emmet I have not yet determined.

Dr. Henry C. Coe, of New York.—In three autopsies there was pressure upon the ureters two inches from their endings by cicatricial nodules, which were associated with uterine disease. In these three cases there was a pressure on the ureter, and I think this irritation of the ureter would probably have overcome the obstruction.

Dr. Bache Emmet, of New York.—I wish to put in a plea for the method of inspecting the mouth of the ureters by median cystotomy. It has the advantage that one may turn out the extremities and see plainly if any discharge comes from them, and what is its nature; by giving close attention one may see them discharge alternately, and it is also possible to probe them thoroughly. Furthermore, by this method we afford the desired relief at the same time that we make our diagnosis complete, taking the view that with ureteritis we commonly have also cystitis.

I do not wish to discredit the importance to be attached to an examination of the ureters per vaginam, nor to underestimate the value of information so obtained; yet I believe that we should be very guarded in our appreciation of conditions in the pelvis seeming to pertain to the ureters, in that there is great danger of being misled by conditions of inflammation in this neighborhood.

I have myself a number of times been led to explore the ureters per vesicam in the belief that disease could be traced to them, but I have been satisfied that they were intact when I failed to enter them. In many such cases I have been certain that the seeming disease of these parts and of the bladder has been, in reality, one pertaining to chronic salpingitis or old peritonitis in the neighborhood.

What I would, then, particularly insist upon is that we should not overlook these more common affections and determine upon a disease of the ureters which may be very doubtful.

Dr. Henry T. Byford, of Chicago.—It is strange how difficult it is for beginners to find the ureters, yet wonderful how easy their recognition becomes to one accustomed to palpate them daily. After practising ureteral palpation upon one hundred cases I came upon a method of catheterization by the vaginal touch that seems to me simpler than Pawlik's. I find the

ureters by introducing my index finger as far as the cervix uteri, and then passing the upturned finger-end from the cervix as a centre along the radii toward the pelvic walls. The ureter is felt like a cord or ridge as the finger-end glides from the softer parametrium over it to the firmer peripheral cellular tissue. After tracing this cord or ridge to the interureteric ligament near the median line, the catheter in the bladder is pushed back until its point is felt by the vaginal finger on the other side of the vesico-vaginal septum. The finger and catheter may then be passed backward together and the interureteric ligament felt to slip between them. The trigone is thus palpated about half an inch to one side of the median line, and the ureteral opening sought by the catheter assisted by digital pressure and guidance from the vagina.

Dr. W. H. Baker, of Boston.—I have listened to Dr. Kelly's paper with a great deal of interest. We must all admit that this is a procedure that requires much experience before it can be performed successfully.

I think there are very few operations that try the patience of the beginner more than this searching for the ureter, for its catheterization. I attempted it a year or more ago, after talking with Dr. Kelly, and had to make repeated trials for a long time before I succeeded in entering the ureter. I think the great value of this operation must be recognized by all, particularly in cases in which there is a marked inflammation of the bladder, where, if we can catheterize the ureter, we can determine whether or not a similar condition extends to the ureter and the pelvis of the kidney—we are thus able to give a much more intelligent prognosis.

There is one point that it is well to consider in this connection, and that is, the malposition of the ureter that we occasionally, although rarely, find. Such a case occurred in my experience some time ago, where I found the left ureter extending down by the side of the urethra and finding its outlet just below and to the left of the meatus urinarius. Such occasional malpositions of the ureter mislead us and call for very careful treatment. In the case just referred to, I was able to dissect out the ureter from the vesico-vaginal septum, and opening the bladder at the point where the ureter should normally enter that viscus, stitch the end

of the ureter to the interior of the bladder; a most successful result was thus obtained. Dr. Emmet and some others have called attention to that malposition of the ureter which empties into the cul-de-sac of the vagina. I think the importance of the subject is certainly very great, and one, as I said before, where the experience of touch is only obtained by long practice.

Dr. Kelly.—The various methods of occluding one ureter while urine was collected from the other have more of an historical than practical interest thus far, from those of Tuchmann, who caught the orifice and pinched it in a lithotrite, and Silbermann, who tried to occlude the orifice by filling a bag with mercury after introducing it into the bladder, and then by rolling it to one or the other side to occlude the ureter of that side. Hegar's suggestion to cut down on the ureter in the vagina and ligate it temporarily, is the safest and surest method. Warkalla, in a series of carefully conducted experiments upon the cadaver, found, when he attempted free hand to pass a ligature, carried on a curved needle, through the thickness of the vaginal wall and around the ureter, that he often pierced the ureter.

I have long practised the method urged by Dr. Byford, that of discovering the position of the ureters by touch and catheterizing under this guidance, but it has not yielded me the results I expected, and is not so practical as Pawlik's method.

I have attempted in my paper to show the practicability of palpation of the ureters, as demonstrated by Sänger, and that here we have a means of diagnosis opening up a new realm of diseases to the gynecologist, and taking many cases out of the list of functional diseases which will by this means be found to be distinct inflammatory diseases of the terminal extremities of the ureters.

THE CAUSE AND TREATMENT OF URETHROCELE.

By Thomas Addis Emmet, M.D.,
New York.

The condition which has been accepted as one due to prolapse of the urethra, and known as urethrocele, has generally been regarded as a result of the injury at the vaginal outlet, misnamed laceration of the perineum, and has been considered the direct consequence of a loss of support from below. I shall presently present what I believe to be the true pathology of the lesion, but at once will state that we may exclude a want of support as the cause. For this condition of the urethra is never found after a first labor if the only other injury be a rupture through the sphincter ani and recto-vaginal septum. This is the condition which does constitute a true laceration of the perineum, yet it matters not how long since the injury, nor what length of time has elapsed since the supposed needed support was lost, no prolapse of the urethra can be detected in such a case.

Urethrocele is always found to exist, in a greater or less degree, where a serious double laceration of the cervix has been sustained, and generally those women suffer most from it who have borne a number of children. It is undoubtedly a common coexisting condition with the so-called laceration of the perineum, but the lesions do not depend the one upon the other. The history of all of these injuries will point to either a rapid or a tedious labor. In one instance the integrity of the tissues has been overstrained before nature has prepared

them for the test, and in the other the tissues have been overtaxed after their vitality has become impaired. The analysis of a number of my cases of urethrocele indicates that the most common cause of the injury was rapid labors, where a few violent contractions of the uterus had been sufficient to terminate them. Next in importance were found tedious labors which had been completed by the injudicious use of ergot or unskilful instrumental delivery. Notwithstanding the fact that urethrocele is a local injury I have never met with an instance of its existence alone, but always some damage has been sustained elsewhere in the pelvis and from a common cause. The damage done to the urethra is always confined to the lower or vaginal part of the canal. Observation would seem to teach that the upper portion never sustains injury unless the whole circumference be lost, from sloughing after an uncalled-for delay in delivery, with long-continued pressure from the child's head resting on the floor of the pelvis. It is a fortunate provision that the portion of the urethral canal lying close up under the arch of the pubes should be so well protected from pressure during labor, as the filaments from the neighboring ganglia, which dictate when the bladder should be emptied, are distributed there. The mucous membrane in this part of the canal differs in being more closely attached to the neighboring or deeper tissues. There is also less submucous or connective tissue under it, so that we seldom see this part of the urethra in a state of prolapse at the outlet, a not uncommon condition in which to find the opposite urethral wall. It is therefore at the more exposed site of the lower or vaginal section of the urethra, and from the more movable character of its lining membrane, that the injury termed urethrocele occurs.

Let us, now, for a moment refer to the anatomy of the parts, bearing in mind that the female has no sphincter properly so called at the neck of the bladder. From the fundus of the bladder and throughout the urethra the number of muscular fibres increases as we advance from above, but these

are for the purpose of expulsion and not to aid in retention. Whenever the bladder is empty a quantity of loose tissue lies about the entrance to the urethra, and this is taken up, portion after portion, as the bladder becomes distended.

We are all familiar with the fact that a distended bladder retards the natural progress of labor, and if instrumental delivery be attempted while it is in this condition serious damage from laceration, and even sloughing about the neck of the bladder, or of the urethra, may result. It has become the accepted practice, that all possible space may be gained, to empty the bladder thoroughly before an instrumental delivery, and to see that no accumulation takes place after the head has reached the floor of the pelvis. The rule is undoubtedly a good one, both in theory and practice; but yet, under certain circumstances, the presence of a few ounces of urine in the bladder may be a protection to the soft parts and act as a cushion; for the fluid will adapt itself and escape by the urethra if the pressure be extreme. As a matter of fact, a slight accumulation does take place generally in every labor before the head passes the perineum and acts as a cushion at the moment when the strain and pressure are the greatest at the neck of the bladder and along the course of the urethra.

An ample arch of the rami below the pubis undoubtedly favors the progress of labor, but it renders the female liable to injury of the urethra from the fact that the canal is thus more exposed to pressure. After the head of a large child has passed out from the uterus of a vigorous woman and reaches the vaginal outlet through such a pelvis, and by the force of pains natural to a condition of perfect health, the tissues are always piled up as it were in advance of the head and can only recede from the situation with difficulty. This effect is first shown in the dilatation of the anus and in the rolling out of the tissues from above. The common result is to split the mucous membrane more or less in the long axis of the canal, an injury which may range in degree from a slight and superficial crack to a fissure through the recto-vaginal

septum, involving the destruction of the sphincter ani. As the occiput passes under the arch of the pubes, the elasticity of the surrounding tissues keeping it in close contact, that portion of the urethra in advance of the head becomes dilated from the crowding into it of loose tissue already referred to at the neck of the empty bladder. From this cause partial or complete displacement of the whole mucous membrane and submucous tissues often takes place along the lower portion of the urethra. In addition, lacerations along the mucous membrane of the urethra, and in the long axis of the canal, are found, like those I have described as occurring in the rectum, and these range in depth from a simple crack to a deep fissure. Sometimes the laceration is a transverse one, in front or behind the sub-pubic ligament, and thus resembles closely the injury resulting from forcible dilatation of the urethra, with the finger or other instrument. At times these lacerations extend throughout the length of the canal and involve the meatus, thus leaving the urethral outlet cleft-shaped and patulous after nature has repaired the injury within. I have seen but a single instance in which the laceration extended through into the vagina, leaving a fistula. Necessarily this would be a rare result, as there exists loose connective tissue between the urethral and the vaginal passages, which is continuous with similar tissue elsewhere in the pelvis. While the urethral canal itself might be readily split through, the force would naturally be spent in the direction of the least resistance and into the connective tissue, consequently the laceration would be less liable to enter the vaginal tissues which would offer the greater resistance. Nevertheless this rupture does sometimes occur, for I have seen several instances in which a deep fissure existed through the vaginal surface and over a portion of the long axis of the urethra, while the canal itself was apparently uninjured. The only explanation must be based upon the supposition that the urethral edges of the opening, lying in close contact, gradually united,

leaving the other portion of the fissure to heal partly by granulation.

Beyond question nature repairs many of these injuries unaided, and but for an increased thickening of the parts it would often be difficult to demonstrate the occurrence. Yet sometimes it happens that the process of repair is either arrested or not attempted and the condition which results is termed urethrocele. We may draw the inference that this arrest was due to the occurrence of a septic pelvic inflammation, which so far obstructed the circulation in the pelvis as to stop all repair as we find with the lacerated cervix, a lesion which will nearly always be found coexisting with urethrocele.

We should use the term urethrocele in its true sense and not designate by the same a condition in which the urethra has received no injury. I refer to the apparent thickening of the urethra due to the sliding forward of vaginal tissue upon it. This condition also is a result of labor, but the tissues can be readily returned in the direction from which they were displaced. I have elsewhere described the operation for correcting this prolapse, which consists in retracting it and then uniting the fold thus formed, as a crescent, across the vagina on a line higher up in the canal; with this brief reference we need not again allude to the condition.

In a true urethrocele the canal remains sacculated and shortened, but not necessarily patulous. By the aid of a uterine probe it is easily demonstrated that the diameter of such a canal is often greater than its length, but the space is well filled by prolapsed tissue from the bladder, or by its own thickened and diseased mucous membrane, to such a degree as frequently to retard the flow of urine. When the canal becomes thus shortened, from an increase of the lateral diameter, the lesion has evidently followed cicatrization from each end of the wound, leaving, as a constant cause of irritation, a pouch in which a certain amount of urine remains after each emptying of the bladder.

I have frequently recognized this injury as a source of reflex

irritation, and have successfully relieved the train of symptoms after others had attributed their origin to the bladder, uterus, and even to the rectum, and after each organ had been treated unsuccessfully in turn.

In April last I had placed under my care, by Dr. George A. Peters, of New York, about the most complete physical wreck I have ever encountered during my professional life. She was sixty-four years of age, and had not been well a day for thirty-seven years, her illness dating back to the birth of her last child. She had given birth to three children; the labors were all hard and tedious, but were terminated naturally notwithstanding the heads of the children were very large. From one cause and another she was unable to nurse any of her children. After a miscarriage, which took place about thirty years before I saw her, it was necessary she should receive constant treatment for uterine or supposed ovarian irritation. But from the time of the menopause at fifty irritability of the bladder became the most prominent symptom. She was a confirmed invalid, and for twenty years had relied upon the daily use of morphine as her only means of rendering life endurable, as she expressed it. Vesical irritation for years had been constant, necessitating the emptying of the bladder at least every half hour, and at times every few moments. Notwithstanding the constant irritation, and that attention had been so long directed to the parts, a diseased condition of the urethra was never suspected, but the symptoms were attributed to the possibility of a stone in the bladder.

This poor woman had become essentially bedridden, her general health was gone, her nervous system unstrung, and withal she was suffering from a constant tendency to a serious diarrhœa, a condition which I have before met with in persons who have long been subject to the use of morphine.

After the menopause the uterine and ovarian irritation became eliminated. But at my first examination I detected in a cicatricial line the evidence of a deep double laceration of the

cervix which had extended to some distance out upon the vaginal walls. After the birth of her last child, she had undoubtedly suffered from a septic pelvic inflammation, to the consequences of which, from adhesions, the supposed ovarian irritation was to be attributed. The everted lips of a lacerated cervix appeared no doubt as the "ulceration," which, during the course of many years, it had been found impossible to heal.

I examined the bladder carefully, but could detect no evidence of disease, and so long as the sound was kept in its regular course there was no special irritation in the urethra. The urethra was nearly as large as a pigeon's egg, but more globular; it was firm to the touch, and no special pain was excited until pressure was made upward against the arch of the pubes. The meatus was somewhat constricted and the canal did not seem overlarge until the point of the sound was turned downward, when it entered the pouch. The increased lateral diameter of the canal was not detected until the instrument was turned to either side. Pressure within the angles caused intense pain, and when repeated while the patient was under the influence of ether the limbs immediately straightened out, notwithstanding she was fully under the anæsthetic.

After some preparatory treatment to improve her general condition, and after the frequent application of hot water for a week, applied directly against the urethrocele from a jet of a Davidson's syringe, I operated.

The patient was placed on the left side, and after the introduction of a Sims's speculum I passed a No. 12 block-tin sound through the urethra into the bladder, and this instrument I bent so that it would not slip out and could be easily held by my assistant. By the use of the sound I pushed back into the bladder the prolapse of tissue, and thus emptied the canal. I secured the centre of the urethrocele with a tenaculum to steady it, and with a pair of scissors bent at an angle I carefully cut down upon the sound. The opening was then enlarged toward the neck of the bladder and toward the

meatus, but without reaching either point, as I wished to preserve the retentive power as well as the urethral outlet. The parts were unusually vascular, and the venous oozing was difficult to control. The tissue which lined the cavity was livid in color and detached to a great extent from the vaginal side of the urethra, and, without exaggeration, it seemed fully an eighth of an inch in thickness and almost gangrenous. I seized in turn each angle of what seemed to be a transverse laceration, drew out the excess of tissue, so as to obliterate the pouch on each side, and cut this off, but left tissue enough to cover the sound which had been retained in the canal as a guide. I then put the urethra on the stretch and, including all the tissues, drew it out to its natural length by making traction with a hook, from each angle of the wound toward the neck of the bladder in one direction, and toward the meatus in the other. By a number of interrupted fine silk sutures I carefully brought together, around the wound, the edges of the urethral and vaginal mucous membranes, leaving the buttonhole opening extending through the middle third of the canal. The result was that I restored the urethra to its natural length by the operation, and formed the canal of a uniform width in correspondence with the block-tin sound which occupied the urethral tract. It is not necessary to describe the steps of the operation at greater length, for I have illustrated the subject fully and have presented the details in my work on *The Principles and Practice of Gynecology.*

At first there was no special improvement, but rather an increase of suffering from the irritation of the bladder, but this was to be expected until after the sutures had been removed and the swelling had subsided. The daily treatment consisted in frequently throwing through the opening in the urethra a gentle stream of warm water wherever it could come in contact with the thickened mucous membrane. Sometimes applications of tannin and glycerine, or of the extract of pinus canadensis were made, and afterward the parts were

covered with a simple cerate to protect them from contact of the urine in its escape while emptying the bladder. After two weeks she began to have less pain locally, and by degrees the quantity of morphine was reduced until finally its use was discontinued entirely.

About the middle of June she returned home, not a well woman, but greatly improved. In fact, it may be claimed that she was already cured of her local difficulty, as she was able to retain the urine for three or four hours and had been broken of her morphine habit. The thickened mucous membrane had nearly reached a healthy condition and will continue to improve. To bring this about, it was necessary to leave the buttonhole in the urethra until some future time, when it will be closed if the parts have then regained their normal state. It cannot be expected at her age that she will fully regain her strength, or that she will be able in so short a time to overcome the habits of an invalid which she has maintained for so many years. But I am certain that she will yet be well enough to get much enjoyment out of her existence, and that for the future she will be free from all suffering in connection with the bladder and urethra.

I had the honor in 1882 of presenting for your consideration a paper on some of the lesions of the female urethra. I then claimed that we had a valuable means for exploration and for treating these diseases by means of the buttonhole operation. As my experience of this operation has increased I have become even more satisfied with the views I then advanced. The operation is not offered as a "cure-all," but, as with the one for closing a lacerated cervix, in properly selected cases, it fills a place for which we have no substitute in treating many of the reflex disorders to which women are subject, and which are so closely connected with impaired nutrition and injury to erectile tissues. In these days of heroic surgery the operation has seemingly been overshadowed and has not received the attention which it deserves.

I earnestly urge again the study of these lesions and the

practice of the operation for their relief; and I will gladly hail at a future day the recorded experience of some member who will have undertaken to investigate fully the operation and its results strictly on its merits.

DISCUSSION.

Dr. Priestley, of London, England.—Before opening the discussion on such an interesting paper, I would like to express a hearty wish, and I think I speak for all the gentlemen present, that Dr. Emmet will soon recover and resume his professional duties. I had the privilege of coming across the Atlantic in the "Germanic" with Dr. Emmet, and I reminded the doctor that many years ago—in 1869, I think—I wrote a paper which was published in the *British Medical Journal*, on "Cyst Formations in the Urethra."

These cases seem to me to have a great similarity, if they are not identical. I was struck with his ingenuity in the description of these cases, and ideas collected to account for the cysts there produced.

I have seen a considerable number of such cases, but in those I recorded in 1869 I called it "Cystic Formations in the Urethra." In one case there was a distinct sebaceous cyst formed in the course of the urethra. So far as I recollect, Sir Spencer Wells saw the case with me in consultation with a view of determining whether any operation could be devised for its cure. In this case the urethra was as large as an egg, projecting through the vaginal orifice in front. The sebaceous cyst with hair occurred in the second case, but it did not occur in the third case. At any rate, the formation in one or more of these cases of a sebaceous cyst, giving dilatation of the urethra and discharge from the urethral orifice, was enough to account for the origin of the urethrocele.

In speaking of the treatment of these cases, I will not venture to make any suggestions, Dr. Emmet's ingenuity of operation being so well known. In cases which occurred so long ago, when we were not so clear as to operations on the urethra as we are

now, I think Sir Spencer Wells and I both had to content ourselves, in one case particularly, in which the lady would not have an operation, by simply supporting the cyst. The case was seen by many physicians and surgeons, and it was reported to be a sebaceous ovarian cyst, which had descended into the bladder, but we know there was no such means whereby a sebaceous cyst could descend. I think the analogy is simply to be found in the follicles at the base of the urethra, and I have no doubt that wherever we have sebaceous follicles in the body we may have sebaceous cysts formed, and sometimes hair.

I should be very glad to hear what the other members of this Association have to say, and I think it calls for very careful attention.

Dr. A. J. C. Skene, of Brooklyn.—I think a word or two might be said in reference to the pathology of this affection as referred to in the paper. It occurred to me that it was a little confusing to class under the head of cystocele two separate injuries or conditions. First, dislocation of the urethra, and then dilatation, chiefly of the middle third of the urethra. They are entirely different in their pathological conditions, although, perhaps, in many cases, due to a similar or the same cause.

If I have heard correctly, the statement was made that the lower portion of the urethra is usually involved; that may be the case in dilatation of the urethra, or the sacculated condition of the middle third, but it is not so in cases of downward dislocations. This fact is well illustrated in complete prolapse of the bladder and urethra, in which the upper or vesical end of the urethra descends through the vulva, while the lower portion remains in its normal position. I am inclined to think that dislocation—that condition in which the urethra is torn away from its supports during labor—is more common than the sacculated condition. In this my experience differs from that of the author of the paper.

Laceration, transverse or longitudinal, produced as a result of labor, I think must be more rare than we are given to believe from the paper. I have had occasion to make several post-mortem examinations in fatal cases of labor, and I have found the usual dislocation of the urethra and the contusions which so often occur, giving rise to sloughing, inflammation, etc.; but I have never

found a transverse or longitudinal laceration of the urethra or its mucous membrane. Again, I have had occasion, in cases less disastrous, in which there was some difficulty in the urinary organs after labor, to examine the urethra with great care to see whether any lacerations had taken place. I have found contusions, but no lacerations, as in the cervix or perineum.

Taking this view of the pathology, of course the treatment would be modified. I can hardly see how making an opening into the centre of the urethra would be applicable for the relief of the dislocation of the urethra. It would be eminently proper in those cases of sacculation or dilatation of the middle third of the urethra, and I think there is the field for that operation. Such, at least, has been my experience, and I have tried it several times, and have seen many cases operated by others.

Dr. William T. Lusk, of New York.—I think it is no more than fair to Dr. Emmet to state very briefly my own experience with this operation.

It is now a number of years ago, when on a visit to the Woman's Hospital during Dr. Emmet's hour, a patient was brought in on whom this operation was performed. I recognized her as an old hospital patient of mine. She had been two or three months in the hospital under my treatment for inflammation of the bladder. From Bellevue she went to the Woman's Hospital, and was for a time under Dr. Lee's charge. Dr. Lee made a buttonhole fistula in the bladder, and afforded her some temporary relief, but after he closed the buttonhole the symptoms returned. Then Dr. Emmet put her under treatment, and operated in the manner described, and she was completely relieved; she had no suffering whatever. I then immediately went to the Bellevue Hospital, where I had a patient with a very similar condition, and determined to test the operation. She had been a number of weeks in the hospital, and, to my surprise, she was well in a few days.

Since that time I have operated perhaps once, twice, or three times a year. I have only found the operation useful in cases of urethrocele proper; the results have been marvellous in many cases. Of course, there is perfect retention of urine after the operation, but it is, perhaps, as well after the cure has been completed to close the urethral opening. Nevertheless, I have never

been able to do this; a woman who has once suffered from this form of trouble and got well, is rarely willing to take the risks of recurrence by allowing the closure of the opening.

Dr. Howard A. Kelly, of Philadelphia.—Although these lesions are rare, their importance is very great, as they are usually unrecognized. In the *Edinburgh Medical Journal* Skene Keith reports an interesting case at length. In passing a catheter into the urethra he observed that at a certain point a quantity of fetid urine and pus flowed, and beyond this, on entering the bladder, the urine was clear. The treatment after Dr. Emmet's plan, by excision of the sac of the urethra, was simple and effectual.

I think it is important to bear in mind the fact that there is a false urethrocele; that characteristic tubercle which comes down under the pubis carrying the urethra outward with it is not a urethrocele; the urethra does not dip into it, and it remains there in spite of any operation on the posterior wall.

Dr. Skene, of Brooklyn: I did not say that they were rare, but that that form of dilatation was very common. The sketch Dr. Kelly has given of the younger Keith's cases is precisely that given fifteen years ago by Dr. Bozeman.

Dr. Duncan Emmet.—All I want to say is to call the attention of the Society, as Dr. Skene did, to the entire difference between the sebaceous cyst and urethrocele. Dr. Priestley refers to this urethrocele which Dr. Emmet speaks of in his paper. Urethrocele refers to the condition in which the lumen of the urethra is involved—quite distinct from a dilatation of a sebaceous follicle.

Dr. Englemann, of St. Louis.—In any of these cases did the trouble return after the closing of the opening?

Dr. Emmet.—When the operation has been performed in a suitable case the patients are always relieved of their symptoms, and when they are so relieved I never knew it to return.

THE TREATMENT OF PELVIC ABSCESS.

By R. S. Sutton, M.D., LL.D.,
Pittsburg.

The scope of this paper will be limited to that variety of abscess following pelvic cellulitis, which is a very common disease among women of all ages, and is by no means confined to the puerperal period. Fortunately, abscess is not the usual termination. Possibly this fact may be explained by the existence of two forms of the malady, and by the difference in the severity of that type most prone to suppuration; these forms may be denominated the septic and the aseptic. If exception should be taken to this division, we may then claim a class of cases in which the septic element is well marked and clearly traceable, and another class in which this element is simply theoretical.

There is a recognized diversity in the nature of septic matter, and the routes by which it penetrates the pelvic tissues are well known. For instance, the parametritis which is the antecedent of pelvic abscess may be occasioned by gonorrhœal infection, the process apparently extending, by continuity of surface, from the vaginal and cervical mucous membrane to the parametrium, frequently producing in its course a suppurative salpingitis, an ovaritis, or even a peritonitis. Again, it may appear after the introduction of instruments into the uterus, infection ensuing from the non-observance of antiseptic precautions. But this route, *per vias naturæ*, is not the only one by which septic matter reaches the intra-pelvic tissues. For instance, a woman whose cervix is lacerated during labor may be inoculated by a dirty finger,

or, after the labor has been concluded, by the foul condition of her own discharges. Again, after abrasions of the lining membrane of the genital tract by instruments, or, after dilatation of the cervix by unsuitable dilators, or those that have not been disinfected, or by sponge or laminaria tents, septic matter may find entrance to the absorbents or bloodvessels, producing there a lymphangitis, or phlebitis, accompanied by a cellulitis. But, in addition to the introduction of septic matter into the hidden structures by continuity of surface and through abrasions, we know that inflammation may attack deeper structures by reason of contiguity of surface alone. Thus, cellulitis is frequently accompanied by a pelvic peritonitis; the infection here is, no doubt, due to the absorption of inflammatory products by the vascular and absorbent vessels common to both tissues.

Irrespective of the variety of cellulitis clearly traceable to the introduction of septic matter, there is a form of this disease occurring in virgins, and in otherwise healthy women who have passed the menopause. Inasmuch as we cannot trace the septic origin, we are left to conclude that, in such cases, the disease is idiopathic, or that its origin is identical with those congestive conditions which we so often ascribe to atmospheric changes under the dictum "taken cold."

With acute cellulitis established, our first efforts are spent in limiting its severity and latitude; we enjoin rest in the recumbent position, give opium to allay pain, and administer copious douches of hot water, plain or medicated, to lessen the tension, remove congestion, quiet the nervous irritability, and promote asepsis. When the abdomen is tympanitic, and tender under pressure, indicating an involvement of the peritoneum, we are taught to resort to hot poultices, whether by reason of the antiquity of the remedy or for the good they do, is questionable. For my own part, I prefer an early blister, dressed subsequently with absorbent cotton, or, if the blister be objected to, I place an ice bag over the abdomen. To relieve the tympany and unload the bowels and portal circula-

tion, copious enemata of hot soap-suds with turpentine, and an occasional dose of sulphate of magnesia, will be found effective. In addition to these remedies, febrifuges and a nutritious, but non-stimulating, diet, are essential. However, should the attack persist and suppuration threaten, the hot poultices are an effective means of promoting it, as old Archigenes pointed out seventeen hundred years ago. I have had no experience in the use of specific medication, beyond the administration of sedative and antifebrile doses of quinine. I am, therefore, unable to say what may be accomplished by attempting to destroy the poison already deposited in the cellular tissue, by the internal administration of bichloride of mercury, the sulphides, salicylic acid, or the sulpho-carbolates.

In spite of all opposing measures, the inflammation will occasionally result in the formation of pus, made manifest by higher temperature, hectic, rigors, and sweats, indicating the absorption of ichor, the shock, and the effort of nature to avert a calamity by speedy elimination. As the multiple pus cavities coalesce, and accordingly as a long or short period supervenes, fluctuation, more or less distinct, may be detected, most probably in the vagina or rectum, or in the iliac region close to Poupart's ligament. Having made sure of the presence of pus by distinct fluctuation, or, when the fluctuation is indistinct, by means of the hypodermic syringe, aspirator, or exploring needle, the cavity should be opened with a knife, trocar, or Paquelin cautery. If possible, a drainage tube should be placed in the wound through which the sac may be washed out and drained. If the surgeon should decide to open the sac through the rectum, it is best accomplished by means of a long curved trocar, through the canula of which the sac may be thoroughly irrigated. The opening may be maintained by frequently passing through it a male metallic catheter, through which the irrigation may be repeated.

It rarely happens that the specialist has to deal with these abscesses in the acute stage. His case usually presents itself with the pelvis occupied by indurated masses, to either side

of, or surrounding and fixing, the uterus, and frequently with the history of occasional discharges of pus; according to my observation, these discharges are most frequent through the rectum, less frequently from the iliac region, sometimes through the vagina, and very rarely through the bladder. It has occurred to me, therefore, that if a pelvic abscess opened into the vagina, recovery was almost sure to follow, and, furthermore, that this is the most favorable route to select in the artificial evacuation of pelvic abscesses.

Mr. Lawson Tait has shown, and many of us have verified his experience, that an accumulation of pus in the tubes is best treated by laparotomy and the removal of the tubes, and also, that when a pelvic abscess has risen into the suprapubic region, it may be cured by laparotomy, stitching the sac to the abdominal wound, and then opening and draining it.

Those cases in which discharging sinuses exist on the skin or mucous surfaces, constitute, in my experience, the most difficult cases to treat successfully. To meet the indications in these cases, avenues must be opened for the escape of pus, the cavity of the abscess sac must be closed, and the recuperative powers of the patient sustained and improved. When the sinus terminates on the cutaneous surface, a probe should be passed along its course, and by counter-openings the sinus may be shortened or made to terminate in the vagina. Sections of the old sinus of no further use for drainage, should be curetted and compressed. Other portions of the sinus should be dilated for the introduction of drainage tubes, through which irritating fluids may be used for irrigation. If it be possible to reach the sac, its walls may be scraped with the curette prior to the introduction of the tube and irrigation with an irritating antiseptic fluid. When the opening to the sinus is small and located in the vagina or rectum, it may be distended by means of a uterine dilator, and room thus be made for the introduction of the drainage tube, and subsequent irrigation.

If the opening be into the rectum, the patient should be anæsthetized and placed in the lithotomy position, and the

rectum having been washed out, search should be made with the finger for the mouth of the sinus. Guided by the finger, a male inelastic catheter may be passed forward into the sac, its arrival there being shown by the escape of pus from the proximal end of the tube. Pressure with the fingers over the brim of the pelvis, will enable the surgeon to recognize the beak of the catheter in the sac.

A uterine dilator should now be substituted for the catheter, and the sinus sufficiently dilated to secure a free opening. Reintroduction of the catheter and irrigation through it, should then follow. This process repeated at intervals of a few days, the irrigating fluid being 1 : 1000 solution of bichloride of mercury, has enabled me to cure cases of long duration.

Dr. Byford, of Chicago, has recommended divulsion of the anal sphincters, for the purpose of reaching and opening these sinuses for subsequent treatment.

Patients discharging pus through the rectum at intervals, have presented themselves for treatment, in whom the entire pelvis was filled with organized exudates, fixing the uterus, and for whom, as a final measure, I have opened the abdomen.

The medical treatment properly conjoined with the surgical treatment of these old pelvic abscesses, may be briefly stated. The general health of these patients is often deplorable; anæmia and neurasthenia, with miserable digestion and assimilation, are not infrequent complications, and a daily exacerbation of temperature indicates the constant absorption of poison. As long as the temperature exhibited a daily rise above the normal, alcohol and bitter tonics, with or without cod-liver oil, have been satisfactory. After the temperature became less undulating, a substitution of malt liquors for the stronger alcoholic liquors has been beneficial. Preparations of iron have been uniformly disappointing. Good diet, nitrogenous in nature, has been chosen with great advantage, and after the digestion and appetite had improved, the patients were permitted to eat as often as they became hungry. Such hygienic measures as cleanliness and ventilation were carefully observed.

After the secretion of pus had ceased, iodide of potassium has been given to assist in the absorption of remaining exudates, and in some cases, in which the capillary circulation was poor, to improve it. This disease in the pelvis has occasionally been followed by pulmonary tuberculosis and death.

There are no cases coming before the specialist more perplexing than those we have just considered. Not a few cases of old pelvic abscess are incurable; some by reason of the difficulty of reaching and draining them, others by reason of the pathological condition of the sac itself, or the presence of old exudates around the walls.

It has been my object in this brief paper to present the results of my own experience, rather than attempt the more tedious task of collecting and collating the literature of the subject.

DISCUSSION.

Dr. William Goodell, of Philadelphia.—Without going at all into the vexed question of the pathology of pelvic abscess, I wish to make one statement: that in all my experience—and I have seen a great many so-called pelvic abscesses—I have never met with one arising from gonorrhœal infection. As the result of such infection I have repeatedly found pus in the tubes or in the ovaries, but in small quantity, never pointing and never forming what we call a pelvic abscess. In my opinion, septic infection is largely the cause of pelvic abscess. We as gynecologists know this relationship, and, accordingly, take careful antiseptic precautions in all our operations.

With reference to the cases of frank inflammation which Dr. Sutton referred to, I think they occur almost always at the catamenial period, and are brought on by the arrest of menstruation, through catching cold or by other causes, such as vaginal or rectal injections of cold water, or coitus at such times. Those are purely aseptic cases of inflammation, and they rarely form abscesses.

I wish to call your attention to a point on which I differ with Dr. Sutton. The first rule with me is to open the abscess as early as possible, viz., as soon as it can be felt and can be opened without undue danger and damage to the woman. To effect this, I introduce a closed pair of scissors by a boring motion. As soon as the pus sac is reached, the blades are partly opened and then withdrawn so as to enlarge the opening. After this I dilate with my slender uterine dilator and insert a winged drainage tube. When the abscess, unfortunately, opens into the rectum, I treat it very differently from the manner given by Dr. Sutton. Wherever the little nipple of the fistula in the rectum can be found, my rule is to insert in it a bent probe. As soon as its tip is felt through the vaginal cul-de-sac, I cut down upon it and convert the rectal fistula into a vaginal one, by the continued use of a winged drainage tube. In every case a complete cure has followed this treatment. It certainly is not safe to follow Dr. Sutton's plan of enlarging the rectal fistula, for foul gases and fecal matter must enter the pus cavity and prevent healing. My rule then is to convert a rectal into a vaginal fistula, but in some cases it is too high up and we cannot reach it. What then is to be done?

The treatment which Lawson Tait brought into vogue is a very good one, that of making an abdominal section and uniting the edges of the abscess wall to the edges of the wound. It is a very excellent and successful way when the abscess is large. But there are cases in which the abscess cavity is a small one, and it opens, we will say, into the rectum so high up that we cannot reach the fistula; or it fills up to a certain limited point and then bursts either into the rectum, or into the bladder, or into the small intestine, never attaining a sufficient size for us to feel it *per vaginam* or, after abdominal section, to stitch its walls to the abdominal wound. These are difficult cases to handle, but they can usually be cured. Under these embarrassing circumstances I perform the following operation: after making a small incision through the abdominal wall, I define the exact locality of the abscess. With the fingers of my left hand in the abdominal cavity as a guide, I pass into the abscess, *per vaginam*, a blunt instrument, such as a blunt pair of scissors or a grooved director, and then enlarge the opening by a uterine dilator and

put in a drainage tube. If one can get a sufficiently large drainage tube into these abscesses, they are bound to heal up, and irrigation is a great help to that end. I use the bichloride solution, except in cases of rectal fistula, for then I dare not, lest some of the fluid should get into the rectum and poison the patient. Formerly a solution of carbolic acid was my favorite irrigating fluid, but I gave it up after a severe case of poisoning from its use. Hence I prefer the bichloride solution to any other.

Whenever the abscess has burst by an iliac opening, my rule is to search and find whether a counter-opening can be made in the vagina, which is the best and most dependent place for pointing. Accordingly, a long uterine sound is introduced into the fistula and if its tip can be felt impinging on the vagina, I cut down upon it and draw a drainage tube through from the vaginal to the iliac opening. By this method we can usually heal these abscesses however bad they may be, or however long they may have existed. The worst cases are those in which the perineum is riddled with fistulous tracts. My plan then is to try to find two of those most widely separated which will communicate. This is found out by the introduction of a uterine sound in each one simultaneously. The fistulous tracts are then dilated and hard-rubber, but flexible catheters, are coaxed in. Through these a solution of corrosive sublimate is daily injected. Sometimes I have used continuous irrigation by a claret-and-water colored solution of potassium permanganate.

Dr. Parish, of Philadelphia.—I will merely speak of the surgical treatment of one variety of pelvic abscess. If the abscess is located in the extra-peritoneal tissue, we all recognize the great necessity of emptying the pus as early as possible. In cases of abscess early after labor the abscess is rapid in progress and generally septic in character, and hence the necessity of early operation. I have had an opportunity of operating on several such cases within a few weeks after labor.

In reference to the evacuation of pus, I think the aspirator should never be used in pelvic abscess, except as a means of diagnosis. I do not believe as a curative measure it is reliable or safe, and in a large number of cases in which the aspirator is used the inflammatory action will be increased and there

will be the necessity for further surgical procedure. Hence I do not use the aspirator as a curative measure, and very rarely do I use it as a means of diagnosis. If the abscess is lying low in the connective tissue of the pelvis, as has been indicated by Dr. Goodell, opening through the vagina is the most easily performed, and under some circumstances the best procedure.

In opening deep-seated abscesses *per vaginam*, I make an incision of the mucous membrane and then push in a director and dilate along that, and then wash out the cavity with a corrosive sublimate solution, 1 to 3000. I should certainly require a very large free opening for that purpose.

There are a good many cases, and especially in the early history of them, in which it is impossible safely to open through the vagina, and it is not safe to wait until there is a distinct tumor in the lower abdomen, inasmuch as the pus burrows so easily and rapidly, after labor, into the surrounding tissue. In one or two cases in which there was a question as to the extent of the abscess, no fluctuation being present, I have made an incision in the median line, partly exploratory in character, but also with the view of facilitating the procedure of opening the deep pelvic abscess by the extra-peritoneal method. After making an incision in the median line, I have carried my two fingers into the opening into the abdomen and then made a second incision above Poupart's ligament. Then going deep into the pelvis I have been enabled to evacuate the pus that was not sufficiently accessible through the vagina. Thus making a large incision I have been able to evacuate the pus completely and wash out the cavity thoroughly with corrosive sublimate solution. The patients I have thus operated upon have made a rapid recovery, after introducing, of course, a large drainage tube into the cavity of the abscess. In one instance I was able to follow a track from the left half of the pelvis to the right.

Of course, the incision in the abdominal wall is sutured immediately, and I cover it with an impermeable antiseptic material to prevent communication of pus from the second incision made above Poupart's ligament.

Dr. Henry T. Byford, of Chicago.—The proposition that these pus accumulations result from ovaritis or salpingitis is not universally true, because I was once present at a post-mortem

examination at which a pus sac, the size of an egg, was found between the uterus and bladder, while the tubes were healthy. It has also been asserted that there are only two avenues through which these pus cavities should be evacuated, viz., either upward over the pubes or through the vagina. This is a statement that requires more proof than has been brought forward to maintain it.

A pelvic abscess should be given the most direct outlet possible. I recently had a case in which an abscess discharged into the bladder, and got well rapidly. It was so surrounded by exudate, due to tubal disease, that the best and almost the only way to reach it would have been through the bladder. A large proportion of these abscesses burrow down beside the rectum, so that only the rectal wall is between the pus and the rectal cavity. These should be opened from the rectum, which is usually in relation with their lowest and least vascular point; or they may often be allowed to discharge in the rectum and the opening be dilated or fitted with a drainage tube. The majority of cases of pelvic abscesses I have met have discharged into the rectum, and got well. The greater part of these cases are not only not seen by gynecologists, but are not recognized by the attending physician. An attack of diarrhœa follows an attack of pelvic inflammation, and the patient recovers rapidly—almost immediately. I have seen this occur time and again, and consider the prompt recovery that usually occurs in such cases as evidence that the rectum is pointed out, and proved by nature to be the proper, and only proper, outlet in many instances.

Dr. T. Gaillard Thomas, of New York.—There are some points regarding the treatment with which I feel inclined to take issue.

In the first place, I would say, according to my experience, there are three forms of pelvic abscess which are met with.

The first, I think, is that form which Mr. Bennet described as inflammation of the broad ligament. In his work written so long ago upon inflammation of the uterus and of its appendages, he gave that nomenclature to pelvic abscess—inflammation of the broad ligament.

The first form of abscess we meet with is that occurring in

the cellular tissues intervening between the layers of the broad ligament.

The second form is where it occurs in the cellular tissue between the vagina and the posterior part of the uterus.

The third form, and much the most rare, is where it occurs in tha areolar tissue, between the bladder and the uterus, extending down from the bladder.

I think that the hazardous operation of laparotomy can often be avoided by opening by the vagina and allowing thorough drainage.

Now I suppose we are all agreed upon this fact, that the sooner this abscess can be opened successfully the better. Given, a tumor in the pelvis from the result of inflammatory action in the areolar tissue in the pelvis, which has existed over a month; I merely take this time arbitrarily, say not more than a month —some approximate time—whether fluctuation is discovered or not, an exploration of that mass ought to be made, and when this is done it will be amazing to find how completely fluctuation is absent, even to the most practised finger, and the commonly hard masses will often be found to be filled with pus.

Before giving the treatment, I would like to say there is a great difference which we all recognize between that form which follows parturition and that form which comes in the non-parturient woman. The parturient abscess is apt to open by the abdomen, the other forms only exceptionally so. The parturient abscess develops rapidly, the others much more slowly.

There is one point I want to mention, and that is this: that the man who waits for constitutional symptoms in abscess existing in the pelvis, will wait very long, for he will commonly find pus in the pelvis and an entire absence of constitutional features. We are all agreed regarding the general features of treatment.

There are but two passages by which pus ought to be let out of the pelvis. I do not think, even if it threatened to occlude the rectum, it ought to be opened through that canal. In my experience two deaths have followed openings of this kind. In one case I found almost no constitutional symptoms; the patient was a large and healthy woman. The abscess was opened by the rectum and the patient died of septicæmia. We frequently

find gases from the intestines filling such abscesses and a certain amount of fecal matter. I have seen one other case of death following the opening of an abscess in this way. The supervention of very serious symptoms immediately following the opening showed us that that was the cause of death.

I do not believe that any one would propose opening by the bladder, consequently there are only two passages, either by the vagina or by the abdominal wall. I think we ought to avoid as far as possible openings in the median line for pelvic abscesses. I think that Tait's operation for pelvic abscess is always a hazardous one. I do not wish to deprecate its merits; it is an operation which, under certain circumstances, must be practised —but they are only a few, and I think it is far more honored in the breach than in the observance.

My method of opening these abscesses is this: if an abscess opens into the rectum, even although I have found the entrance, which is very rare, I do not wash it out by the rectum, but I separate the vaginal wall from the posterior surface of the uterus, just as we do when we are going to extirpate the uterus or amputate the cervix. If I can thoroughly separate the peritoneal wall, I carry my finger up and palpate very thoroughly, and I have succeeded in a number of cases in reaching these abscesses very satisfactorily by forcing the uterus down and carrying the finger up, and, if necessary, a portion of the hand. When I have reached the abscess, I open it and take an ordinary dilator (Dr. Goodell's modification of the German instrument), and then I dilate fully and introduce a drainage tube. If the abscess is anterior to the uterus, I separate the anterior wall just as if I was going to extirpate the uterus, and go upward and try to reach it in that way.

Mr. Matthews Duncan, in regard to these abscesses, says: You will sometimes find a true pelvic abscess which is entirely movable. Sir James Simpson had drawn attention to the fact that pelvic abscesses were almost always immovable, and that neoplasms were almost always movable.

I follow now a routine method of reaching pelvic abscesses. There are a number of gentlemen here, Dr. Hunter and others, who have assisted me. The patient is laid upon her back and anæsthetized; the phlegmonous mass is seized by the operator's

hand and pushed down as low as possible. Then the operator puts his finger against the most protruding point behind the bladder. Then carrying the scissors on the finger an opening is made into the vagina, and through that opening the finger, pushing the scissors lying upon it, is carried in until it strikes the hard mass of the abscess; always being careful to avoid hemorrhage. Then Goodell's dilator is carried up and the passage dilated. I always employ a thoroughly aseptic soft-rubber tube. I then take a curved forceps, and upon the finger which has not been removed I carry the tube into the abscess, and push it up as far as it will go. When it is carried thoroughly up in this way it is cut off, and the lower portion split so that we have two lips to the tube, and these two lips are sewed into the vaginal wall with wire or silk. Then I wash out with a 2½ per cent. solution of carbolic acid, unless the tumor be a large one, when I use the bichloride from 1 to 3000, or 1 to 4000. If the symptoms do not disappear, then I use a stronger solution, but I do so with hesitancy. If there is an adhesion between the abscess and the abdominal walls I take an ordinary surgical exploring needle, push it through the roof of the abscess, and slide it down into the opening, cutting as little as possible, for fear of hemorrhage, and then inserting a drainage tube. If there be no sinus on the abdominal wall, and no connection with it, I always make an incision along Poupart's ligament, push the peritoneum forward and plunge a finger into the abscess. I then put in a tube and drain the abscess through this tube and wash out thoroughly with antiseptic solution.

With regard to the constitutional treatment afterward I have nothing to say.

Dr. W. M. Polk, of New York.—I am free to confess, that my observations, made at the autopsy and operating table in Bellevue Hospital, upon "so-called" cases of cellulitis, have failed to confirm in me a belief in the prevalence of that condition.

The cases were noted as they came into the ward, without any design at selection, and numbered 100; all presented the symptoms and signs of what is called cellulitis, but upon performing laparotomy and clearing out the diseased tubes and ovaries with associated adhesions, I found that the indurations had disap-

peared. (By indurations are meant the hardenings or thickenings in and about the pelvis, particularly about the floor, which are put down as the positive physical evidence of cellulitis.) In consequence I was compelled to abandon the recent, and, to some extent, present, pathological ideas upon this subject, and fall back upon those long ago advanced by Bernutz.

In certain cases, as of septicæmia, inflammation chooses the same route from the uterine cavity that it is likely to take elsewhere—that is, along the lymph and bloodvessels; but I have failed to convince myself that inflammation should be granted greater privileges in the uterus than when developed upon similar tissues in other parts of the body. Inflammation short of the condition called septicæmia travels along a mucous membrane rather than through it; witness the mucous membranes of the genito-urinary tract, male and female. Therefore, I accept the common forms of pelvic inflammation, called cellulitis, as being, in reality, tubal disease and its products.

When I began my remarks yesterday I did not expect to be drawn into anything more than a simple allusion to the questions pertaining to the pathology of pelvic abscess itself.

I will be brief, and I will commence by saying that wrapped up in this question of the pathology is undoubtedly the question of treatment, for the reason that if we can maintain successfully that these abscesses originate outside the peritoneal cavity the necessity for laparotomy is rarely to be found. If it is found to be intra-peritoneal, in the tubes and cavity of the peritoneum, then it appears that the question of laparotomy becomes a pressing one. If, for instance, the bed of these abscesses is extra-peritoneal, then it is difficult to get rid of them by laparotomy; if, on the contrary, they are intra-peritoneal starting in the tubes, for instance, then it is a simple matter to shell them out, and by a process of enucleation get rid of the pyogenic sac. This gives a radical cure, enhances the chances for life of the individual, and cuts short the usually long period of ill health.

It is a singular circumstance that this same question as to the intra- or extra-peritoneal seat of pus collections has lately been agitating the general surgeon quite as much as ourselves. I

refer to the pathology of perityphlitic abscess. When you recall that the appendix hangs free in the cavity of the peritoneum, you can understand that if an abscess arises from a perforation of this organ, that abscess must be of intra-peritoneal origin; but I do not pretend to say that under certain circumstances, in the case of the appendix, as well as with the tube, there may not be such an adhesion to the peritoneum as to result in perforation of the membrane at the point of contact with the development of pus collections in the cellular planes outside the peritoneal cavity.

In the case of tubal disease, such a condition may arise—I have seen it and reported it, and when once pus gets between the folds of the broad ligament there is no reason it should not follow the courses set down for it in König's experiments.

The question, as you see, is quite broad; but I shall go straight to the point by stating my own experience. I viewed them as cases of abscess in which the pus had originated and lay between the folds of the broad ligament, outside the peritoneum at least; but when I did laparotomy I found pus-distended tubes, or ovaries, or both, with associated intra-peritoneal pus cavities; these cavities being shut off from the general peritoneal cavity by layers of thick and usually dense lymph. When I had removed the purulent tube or ovary, and broken up and washed out and drained the intra-peritoneal cavities associated therewith, I found I cured my cases.

I, therefore, now view most cases of pelvic abscess as of tubal origin, and think that the proper treatment for most of them is laparotomy. But there is an excellent rule in surgery which all should observe, namely, wherever pus points, provided there be no good anatomical reason to the contrary, that location is the proper point at which to reach it. This applies to pelvic abscesses whether they show best above or below the pelvic floor. Yet in some cases in which we make such openings, *a cure* may not result until laparotomy with enucleation of the bed of the abscess has been done.

I do not wish to be understood as denying the extra-peritoneal development of pelvic abscess; I merely believe that such abscesses are the exception, while those of intra-peritoneal, or tubal, origin are the rule.

Dr. H. A. Kelly, of Philadelphia.—Using the word pelvic abscess in a broad generic sense, two cases upon which I operated last week are interesting as illustrating a line of treatment now but little pursued. Both these patients had tubo-ovarian abscesses on the left side. In one case I opened the posterior culde-sac of the vagina with Paquelin's cautery, and explored the whole interior of the sac with my vaginal finger, letting out several ounces of fetid pus. Since then she has rapidly recovered (four weeks later), and with trifling rises of temperature when a little pus accumulates in the sac, progressing very favorably, without having been subjected to the risks of an abdominal operation, very great in her prostated condition.

In the second case the abscess was pointing in the left fornix of the vagina; as the cautery would not work, I used the blunt scissors to open, and then inserted a large dilator, keeping close to the uterus, and thus tearing rather than cutting to avoid injuring the uterine arteries or ureter. It discharged a full pint of fetid green pus. I broke up several daughter cysts inside this abscess; washed with a bichloride of mercury solution, and packed with iodoform gauze, when she was returned to bed. I do not see why it is any more *absolutely necessary* to enucleate the walls of the abscess here than in any other part of the body, if we give free discharge through a dependent opening. The vagina is the best place to let it out, if there are contraindications against abdominal section.

Dr. A. W. Johnstone, of Danville, Ky.—I have seen many of these abscesses at the operating table, as well as examined specimens after they were removed. It seems to me we would understand this whole subject a great deal better if we followed out the work of the pathologist in the diseases of the lungs. There is an acute violent inflammation of the connective tissue which runs a course exactly like pneumonia. How many of us have seen violent inflammations of the whole pelvic floor, which in the course of a week or ten days will all be absorbed, and the attack pass off and the patient recover? I think this is the analogue of acute croupous pneumonia, and we have this located in the cellular tissue.

I am sorry to take issue with my old teacher, but I must say that, after having examined one hundred specimens of so-called

chronic cellulitis, I do not believe that chronic cellulitis exists as a disease *per se*.

In these cases the trouble is in the epithelial structures, and it comes on exactly as does a catarrhal pneumonia, so that the natural growth of the epithelial structures is interfered with.

This growth, then, becomes a pathological process, and keeps up the low grade inflammation and irritation which result finally in what we see as pus tubes. Let me relate the first convincing lesson I had on this subject. It was with Mr. Lawson Tait. Shortly after I went under his instruction he gave me a case, and said, "What is it?" I answered, "It is an old chronic cellulitis; I have seen many of them." "Well," said he, "if it is a case of chronic cellulitis, it is the first one I ever saw." And the next day he removed a pus tube. It is the trick he played on nearly every one that came there, to teach us that these cases are not due to inflamed pelvic cellular tissue, but to either the ovary or the tube. I never could understand before that why it was that chronic cellulitis of the pelvis did not get well like that in any other part of the body; it was a wonder to me why inflammation of the cellular tissue there went on to suppuration and all else got well. The cause of it is not the interference with the cellular tissue, but the interference with the rete mucosa. If by inflammation, starting no matter where, this growth is incurably hampered, you have a source of constant inflammation, which cannot be got rid of except by the surgeon's knife.

Dr. W. Gill Wylie, of New York.—I do not agree with some of the views expressed by Dr. Sutton as to the etiology of pelvic abscesses. Some years ago my views were considered very radical, but now I think most of my colleagues agree with me. My views are based on my experience in abdominal surgery. In the first place, I think cellulitis has always played too important a part in this matter, and that this fact has not yet been made clear to a great many, and there is not much chance of progress as long as pelvic abscesses are looked upon as due to cellulitis, and attempts made to treat them mainly through the vagina. Excluding acute cases of phlebitis and lymphangitis, resulting in phlegmons, occurring soon after labor and abortions, I am satisfied that nine out of ten of the so-called cases of cellulitis resulting in pelvic abscesses are really nothing more

nor less than the sequelæ of salpingitis or ovaritis. That is, those occurring some weeks or months after labor or abortion are almost invariably different forms or stages of salpingitis or ovaritis, and are intraperitoneal abscesses. They are surrounded by adhesions formed from exuded lymph, and though the pus is not free in the general cavity of the peritoneum, the pus is intraperitoneal, and not in the cellular tissue. The best proof of this is obtained by those who open the abdomen to treat these cases. With hardly an exception, the pus is found within the peritoneum in or about the diseased tube or ovary.

If one will follow closely a pyosalpinx, he will find that it almost always, sooner or later, results in the formation of a pelvic abscess. When we open by the vagina, although we may get rid of the pus, the patient is by no means always cured, for the remaining tube and ovary, or any part of either, may cause other abscesses, etc.

So clear are my own views that I can readily decide upon very definite steps as to treatment. Not long since I tried to make my views clear in some remarks in a discussion before the New York Obstetrical Society,[1] and they are these: "I would say that pelvic abscesses have little to do with cellulitis, and that they are nearly always caused by salpingitis and ovaritis due to sepsis of greater or less intensity. If they bulge in the vagina near the cul-de-sac, they can be readily opened and drained without much risk, and if they are actively septic, with high temperature and weak pulse, so that laparotomy for the complete removal of the diseased tube and ovary, which nearly always are found in them, would be very risky. They should first be treated by drainage by the vagina, when this is practicable. If they are in front of the broad ligament, or above it, and can be reached only through the lateral or anterior vaginal walls, then laparotomy is the safer means of dealing with them." For in lateral punctures you are apt to strike a large blood-vessel or one of the ureters. I know of one fatal case in New York and one in Chicago from the use of the aspirator for pelvic

[1] Trans. of Obst. Society, N. Y. American Journal of Obstetrics, July, 1888, page 716.

abscess. In my opinion, where there is danger in opening by the vagina, an exploratory laparotomy should be made.

If I cannot open the abscess by the vagina posterior to the uterus, even in dangerously septic cases I prefer to make an exploratory laparotomy to guide me in making my vaginal opening, as I did not long since in an important case which Dr. Thomas saw with me in consultation. The abscess was anterior to the uterus, pressing the uterus backward and to the right side. The abscess was more or less movable, and I think those anterior to the broad ligaments are more apt to be.

Dr. Thomas advised opening by the vagina anterior to the cervix uteri with the points of a pair of scissors. I put the patient under ether, but could not find a point in the vagina where I considered it safe to puncture; I then decided to open the abdomen to guide me in making a puncture to secure drainage by the vagina. On account of the extremely weak and highly septic condition of the patient, I did not dare to break up the adhesions and remove the diseased tube and ovary, which were plainly involved in the abscess; but I found that I could reach the abscess by a puncture in the vagina posterior to the uterus, which I could not determine as being practicable before doing the laparotomy. The patient was relieved of the abscess and sepsis, but still has her diseased tubes and ovaries to give her trouble in the future.

Dr. Thomas.—Was this abscess discharged by the vagina or abdomen, subsequently?

Dr. Wylie.—It discharged through the vagina; but the opening of the abdomen enabled me to make a safe opening by the vagina.

Dr. Thomas.—Then it seems to me the best of the argument is on my side, as the doctor says it was opened by the vagina and opened successfully.

Dr. Wylie.—Before opening the abdomen I could not determine that I could reach the abscess by going under the broad ligament, but after laparotomy found that I could do so and not run the risk of the opening in the anterior wall, recommended by Dr. Thomas.

Dr. J. M. Baldy, of Philadelphia.—In regard to the pathology of pelvic abscess, I quite agree with the views so ably set

forth by several of the preceding speakers, especially Dr. Johnstone. Of course, abscess may occur in any part of the body and the pelvis is no exception—it may occur here as elsewhere from necrosis, hæmatocele, etc.; but excluding these rare cases I would remark that all cases of pelvic abscess, either chronic or acute, are primarily from the tubes.

In regard to the treatment: Yesterday Dr. Thomas and others advocated two lines of treatment, vaginal puncture and drainage and abdominal section, giving the preference to the vaginal treatment. Puncture and treatment by the rectum were condemned. I should as strongly condemn the vaginal treatment, and think that, as a rule, there is but one proper method, that by abdominal section with complete extirpation of the disease.

Take any of these cases which arise from the tubes and ovaries, and I have assumed that they all practically so arise, and you will very often find that the abscess is complicated by other troubles, such as ovarian cyst, broad ligament, etc. Here is the picture of such a one; I will pass it around—the abscess is, as a rule, itself divided into two or three pockets, each distinct from the other. Such a case could not possibly be drained from the vagina, as most of the complications would remain after one of the pus sacs had been dealt with.

Dr. Martin, of Berlin, advocates opening the abdomen, freeing adhesions, forcing the diseased mass down, and puncturing from the vagina. I cannot conceive why he should not remove the mass as the last step instead of following such an unscientific line of treatment. After vaginal drainage there is always the diseased sac left, which is just as likely to set up subsequent trouble of an inflammatory character as the original disease was. Dr. Martin, himself, gives two cases so treated; one had a mass left, the other had a recurrence of the mass with inflammatory symptoms some months later. He stated that this recurrence was independent of the original trouble which he had cured. This, I think, we are all at liberty to doubt. Vaginal puncture and drainage are at best an exceedingly slow process and after months of treatment leave the woman with the liability of a recurring attack at any subsequent time.

Dr. Thad. A. Reamy, of Cincinnati.—I will not discuss the origin of these abscesses, fully believing that many of them

originate in the tubes; not all, however. The last speaker emphasized a statement as to the treatment which I do not believe to be justified by the facts. He asserted that in all cases a laparotomy should be made and the tubes removed. Some eight years ago, I had under my care, as a private patient, at the Good Samaritan Hospital, a beautiful young woman about eighteen years of age, who resided in Danville, Ky., the home of my friend Dr. Johnstone, who is present, and who is well acquainted with the facts. This patient had a pelvic abscess which I punctured high up in the right cervico-vaginal sulcus, carrying a tube in, fluid was injected, which passed through the Fallopian tube into the uterus escaping from the os. This manipulation was repeated a number of times in the presence of Dr. Giles Mitchell and the house physicians. A self-retaining drainage tube was inserted, permanent drainage established, and permanent recovery followed. This woman is now the wife of a prominent merchant in the city of Lexington, Ky., and is the mother of two children. When she came under my care she had been sick for more than a year; menstruation was painful and irregular. Had I been guided by the modern *dictum*, both ovaries and tubes would have been sacrificed. Mark you. Here was a case in which the disease was unequivocally tubal in origin, tbu which was cured by conservative treatment. Wife, mother, children, and domestic bliss the stake won. These results are to my mind more brilliant than a cure by sacrifice of tubes and ovaries. The marvellous achievements of abdominal surgery may so dazzle our vision as to impair judgment. If a laparotomy is the proper thing, let us do it; but let us not conclude that such a procedure is the universal and sovereign remedy.

Dr. Sutton.—To close this discussion properly one ought to have a little time for reflection.

I intimated yesterday that there are two routes by which septic poisons reach the cellular tissues and produce pelvic abscess. One is through the vagina and uterus and tube to ovary, and then, by contiguity of surface, the cellular tissue. Another route is through abrasions or lacerations in the vaginal wall, or neck of the uterus, inflicted by dirty instruments or fingers, or by the secretions of the woman.

Now it has been objected that a pus tube (we will say gonorrhœa for the sake of formula) never results in pelvic abscess. Dr. Goodell tells us that he has never seen pelvic abscess associated with a gonorrhœal pus tube. Dr. Thomas tells us also that he objects to that pathology. We know that occasionally pregnancy occurs in a Fallopian tube; we know that at the end of six, eight, or twelve weeks that the tube gives way; we know that by reason of the stronger roof that it often gives way at the floor and empties the fœtus into the broad ligament. If the fimbriated extremity is plugged up and the pus cannot escape into the uterus, eventually the tube, by reason of the ulceration or distension of both will rupture, as other abscesses do, in the direction of the least resistance, and the pus will percolate downward between the layers of the broad ligament; and when it points in the vagina or rectum we are told that it is a pelvic abscess, and tubal abcess is never applied to it. That this does sometimes occur I have no doubt; that which was simply a pus tube and which could have been cured by laparotomy, has become a pelvic abscess and discharges by the rectum or vagina.

This is a point which I did not expect to discuss here, at this time. I venture to suggest that a radical change in the writings concerning cellulitis and pelvic abscess has got to be made in this country.

I stated, furthermore, that the poison reached the cellular tissue through abrasions and lacerations of the vagina and cervix. I can point to a gentleman in this room who made a recent post-mortem of a woman after labor and a pus sac was found in the broad ligament adjacent to the laceration in the cervix, and the tubes and ovaries were found to be healthy.

CASES OF OVARIOTOMY PERFORMED TWICE ON THE SAME PATIENT.

By Sir Spencer Wells, Bart.,
Late President of the Royal College of Surgeons of England.

My attention has been called to the performance of ovariotomy twice upon the same patient by the fact that I have had to do this twice within the last three months. On the 23d of July, 1888, I removed a large multilocular cyst of the right ovary from a lady whose *left* ovary I removed in March, 1864, just twenty-four years ago; and on the 31st of May I removed a tumor of the left ovary from a lady whose right ovary I removed in March, 1880, or eight years ago. The first of these patients was a widow at the time of the first operation, and had not married again. She was then forty years of age, mother of five children. She recovered well, menstruated regularly for more than ten years, and enjoyed good health until the early part of this year, when the abdomen began to enlarge and increase rapidly. There was nothing remarkable in the second operation, except that as the pedicle in the first had been secured by a clamp, the stump was firmly adherent to the abdominal wall and was not disturbed. Recovery was quite as rapid as before, and the patient left London four weeks after operation. The lady operated on in March was married, but childless. She was thirty-two years old at the time of the first operation, in 1880, and also remained well until this spring, when increase began and went on very rapidly. In this case, the cicatrix in the abdominal wall being very thin, and resembling a ventral hernia, I excised it by two semi-elliptical incisions, instead of making a simple incision, as I have usually done when the cicatrix was firm; otherwise there was no peculiarity in the operation differing from

an ordinary ovariotomy, and the patient recovered quite as well. The pedicle in both operations upon this patient was secured by intra-peritoneal ligature, and I could find no trace at the second operation of the ligatures on the remnant of the first pedicle.

TABLE.

No.	Date of operation.	Result.	Subsequent history.
1	May, 1862 / January, 1863	Recovered. / Died 7th day.	Septicæmia.
2	February, 1865 / August, 1866	Recovered.	Died June, 1868, pneumonia.
3	December, 1861 / February, 1868	Recovered.	Died eight months after second operation; insane; refusal of food.
4	June, 1862 / June, 1869	Recovered. / Died 66 hours.	Second tumor doubtful ovarian or uterine.
5	February, 1873 / June, 1874	Recovered.	Died April, 1876.
6	May, 1870 / June, 1875	Recovered.	Married, 1876; well, 1881.
7	April, 1873 / July, 1876	Recovered.	Well in 1881.
8	May, 1869 / July, 1876	Recovered.	Well in 1881.
9	October, 1872 / November, 1876	Recovered.	Well in 1881.
10	December, 1865 / December, 1876	Recovered.	Well in 1881.
11	May, 1870 / February, 1878	Recovered.	Well in 1881.
12	May, 1875 / June, 1880	Recovered.	Well in 1881.
13	August, 1876 / November, 1881	Recovered.	Well in 1884.
14	September, 1884 / October, 1885	Recovered.	Well in 1888.
15	March, 1880 / May, 1888	Recovered.	Well August, 1888.
16	March, 1864 / July, 1888	Recovered.	Well August, 1888.

Before making any remark on these cases, or on the practical questions suggested by them, I will arrange in a table (see page 102) some particulars of all the cases in which I have performed ovariotomy twice on the same patient, including two cases in which I performed the second operation, but not the first, which was done by other surgeons. In the other fourteen cases I performed both the first and the second operations.

The performance of ovariotomy twice on the same patient must be unusually interesting to Americans, for, as the first real ovariotomy was performed in Kentucky by McDowell, in 1809, so the first time the operation was performed for the second time on the same patient was in Pennsylvania, by Atlee, in 1861. The patient had been operated on in England, by Clay, of Manchester, sixteen years before. My first case was in 1862, the first operation having been performed by Baker Brown, only eight months before.

At the sitting of the Berlin Society of Gynecology, held last May, a paper by Martin on the repetition of laparotomy in the same woman led to an interesting discussion, which may be found in the first part of the fifteenth volume of the *Zeitschrift für Geburtshülfe und Gynäkologie*. But it will be seen at once that this subject is a far wider one than that to which the present paper is restricted. I have desired only to consider the question of performing ovariotomy twice on the same woman. Martin, Olshausen, and other speakers at Berlin, have included a great variety of cases in their remarks on the repetition of laparotomy in the same patient.: 1, even when the scarcely united wound is reopened to admit of the escape of fluid from the peritoneal cavity, or to drain—that is called a laparotomy; 2, or when some obstruction of intestine has led to vomiting and the usual symptoms, either during the progress soon after the operation, or at some later period, incision with the intention of removing the cause of obstruction, is classed as a repetition of laparotomy; 3, or when the cicatrix has, wholly or in part, become thin, and a sort of ventral hernia has formed, excision of the thin cicatrix

and reunion of the abdominal wall is called a laparotomy; 4, in one case alluded to at Berlin, as in one of mine, the second laparotomy was for the removal of a uterine tumor which had formed after recovery from ovariotomy; 5, in another case nephrectomy was performed after a successful ovariotomy; 6, in others myomotomy or hysterectomy was performed after removal of the ovaries had proved to be unsuccessful in reducing the size of, or stopping the bleeding caused by, the uterine tumors; 7, in other cases, the first operation of ovariotomy having been incomplete, part of an adherent cyst or tumor having been left behind, the second laparotomy was performed to complete the first operation; 8, in a few cases, two of my own, in which the pedicle had been fixed by a clamp to the abdominal wall, the remnant of the pedicle had grown to a sufficient size to cause discomfort or anxiety, and the removal of this enlarged portion of the pedicle has been described as a repetition of laparotomy; 9, in some cases of Battey's operation, in which one ovary only has been removed, the other ovary has been afterward removed, and this may be truly classed as a repetition of laparotomy; 10, Olshausen narrates two cases in which incomplete excision of a hydrosalpinx led to repetition of laparotomy. In one of these cases he operated for a third time; 11, he also refers to a case in which laparotomy was performed five times on the same patient by five different surgeons, of whom I was one. First, one ovary was removed, then the other, then a third laparotomy was done by a third surgeon. All I did was to release a portion of adherent intestine. Olshausen, the fifth operator, excised "a small hard mass from the place where the left ovary had been removed, but in which no ovarian structure could be discovered." The patient lived a year after this fifth operation, and died of some cause unknown to Olshausen. These five laparotomies were all done within six years.

All such cases as those just referred to open questions widely differing from those which may properly be restricted to cases in which an ovarian tumor has been removed from one

side, the other ovary has been left, and months or years afterward has become enlarged into a tumor of sufficient size to require a second ovariotomy.

The proportion in which a second ovariotomy may be called for in the same woman cannot yet be estimated with accuracy. The sixteen cases in my own practice must be reduced to fourteen, as in two the first operation was not done by me. The fourteen cases have occurred in a total of 1199 first operations. It is possible that upon some of my patients other surgeons may have performed a second operation, but the only case I have heard of is one in which Dr. Emmet of New York, successfully operated upon a patient upon whom I had operated nine years before. And the conclusion may probably be accepted as not very far from the truth, if we say that when a woman has recovered after the removal of an innocent tumor of one ovary—the other having been found healthy—the chances that the remaining ovary may become diseased are not more—probably considerably less—than one in fifty.

DISCUSSION.

Dr. T. Gaillard Thomas, of New York.—Mr. President, I feel very much complimented by your calling upon me to discuss this paper, and yet I regret it for some reasons, the chief one being that I hardly feel competent to discuss a paper of this kind without looking over my notes to prepare for it. But I shall be very glad to give voice to the sentiment of the house in recognizing what we all recognize, the value of this paper; and, though short, it will take a valuable place in the literature of a subject upon which so much has been written. Every man who has had much experience in ovariotomy must have met cases such as Sir Spencer Wells has just detailed to us. I have been thinking what cases I could recall in which the ovariotomy was limited, as he has limited it, to cases for the removal of the second ovarian tumor—I have been trying to recall how many I have had, and I can recollect six of this character. In some

of them I have experienced a good deal of difficulty; the author declares he has experienced very little. In those cases which have been followed by peritonitis after the first operation, I have had difficulty in getting through the abdominal wound without wounding the intestine. I have found it lying under the line of the former incision and to one side, and experienced difficulty there. As to the removal of the tumor itself after the cavity has been opened, I found no difficulty at all.

I have very little more to say because I can give no statistics on this point. One lesson can be drawn from these cases, viz., if any good excuse can be found for removing the second ovary when the first ovarian tumor is removed, it is wise to do so whenever there is a true cystoma of the ovary; in cases of a different character I should not think so. I mean to say, if there is not some good reason for leaving it, that it is wiser while the abdomen is open to remove the second ovary. This has been my practice for some years, and I have not yet had reason to regret it. In many cases the removal of the second ovary is not objected to by patients; very often they desire it strongly, that all chances of a return of the disease should be avoided. I very often take out the second ovary and say to the bystanders, "I can find no reason for removing this one."

The remarks which Sir Spencer Wells made in regard to the infrequency of return of disease in the other ovary, I am surprised at. I understood him to say that one in fifty was the proportion of the return. I confess that if before that I had been asked I should have said it was very much more frequent. I think I have had more than six cases, but I have only these in my memory that I dare be positive about. Those are the only cases I can recollect, but if you were to ask me now to state my general impression, I should say that the return of the cystoma in the other ovary was so frequent that one was called upon to remove it unless there was a good reason to do otherwise.

Dr. William Goodell, of Philadelphia.—Dr. Thomas has expressed my own views so fully that I have very little to add, and I have acted for some years upon his plan. At this moment I can recall only two cases of return of the disease in the sound ovary, but the intense disappointment and mental agony which

these women suffered I cannot forget. After the second operation, one died and the other lived; but the mental strain on the survivor has upset her nervous system. This experience influenced me in coming to the conclusion to remove the second ovary whenever I could find a decent excuse for it.

To the reasons suggested by Dr. Thomas for removing the sound ovary, I should add another, viz., whenever the woman has passed the climacteric, or even when she has approached so near to it as to make it unlikely that she will ever again conceive.

I can also endorse Dr. Thomas's remarks in regard to the general willingness of patients to have the second ovary removed. I have had them to urge me to remove it, sound or diseased, and I have had them greatly disappointed afterward to learn that, for some good reason on my part, it was not touched. In conclusion, I think it is also a wise plan to remove both ovaries whenever one is affected by a malignant disease, provided it can be done without adding to the risks of the operation, for I think that malignant or quasi-malignant disease is more liable to affect the sound ovary than a benign disease.

Dr. J. B. Hunter, of New York.—I can recollect three cases in which I removed a second ovarian tumor. In one case it was after a lapse of two years. I quite agree with Dr. Thomas and Dr. Goodell, in regard to the propriety of removing the second ovary after the climacteric, but I thought it a very serious question before, and I have often hesitated whether to do so or not. I can recollect two cases in which there was enough disease to make it a question, and my assistant, who had had a large experience, thought we had better not leave the second ovary, but it was left, and the woman has since had two healthy children. I hesitate to remove it unless the disease is marked. I do not think we have enough statistics, in regard to the recurrence of the cystoma in the other ovary, to warrant us in establishing a rule.

Dr. Howard A. Kelly, of Philadelphia.—The question as to the removal of the second ovary in a woman before or during the childbearing period of life, is one of great practical importance. The rule under these circumstances should be, never remove the ovary unless it is manifestly diseased. I think I have settled this upon a positive scientific basis by a considera-

tion of Sir Spencer Wells's own statistics. Out of the thousand women operated upon, how many having one ovary left had a recurrence of the disease? And out of these, when again operated upon, how many died? This, when answered, expresses fully the disadvantage of leaving the second ovary. Over against this we must set the side of advantage—that is, how many children were born to these women in whom one ovary was left after operation?

Of 1000 women, 232 died, and, therefore, are to be deducted, leaving 768. From this number of women (768) who survived the operation of ovariotomy, we might further deduct those who were beyond the childbearing period, as well as those who never married, and all those who survived, but had both ovaries removed at once, which would bring it down to say about 700. Of this 700, we find that 117 women bore 228 children from their remaining ovary. This is the side of advantage, 228 children born as a consequence of leaving an ovary.

To find the side of disadvantage, which we wish to contrast with this—that is, how many recurrences, and how many deaths there were in consequence, we proceed as follows:

Reject from the 768 women surviving all in whom two ovaries were removed, as well as those beyond the childbearing period, which will approximate say 700. There were, in this 700, eight recurrences, of whom one died upon being operated upon the second time for a solid tumor doubtfully uterine. The result, therefore, as a consequence of leaving one ovary, is 228 children against one woman who died from the second operation.

It seems to me that these figures place the matter beyond the realm of further discussion.

Sir Spencer Wells.—The question raised by Dr. Thomas is one of the gravest consideration, and one which has always been a source of difficulty in my experience. Say you operate upon a young woman, and her other ovary is in a state about which you are a little doubtful, you find it a little larger than it ought to be—many men probably would say that, as there was some doubt, it was better to remove it. It has often been a matter of concern to me as to whether it would be right to remove that ovary or not; I have sometimes done it, and in other cases I have

not done it. I can recall several cases in which the ovary which I thought was a little diseased was left in, and the young women had many children after the operation, and never died in confinement.

I do not know whether you will allow me possibly to read from my own book the conclusion which I arrived at, as to the removal of both ovaries at one operation. I there show that it adds a little to the risk if you remove the second ovary, and I think you will all recognize that there is some added risk.

I find, with regard to the question of age, also, that Dr. Thomas and others have said that after the childbearing age no doubt the danger of the removal of both ovaries is considerably less. But with a young woman it is a very different question, and it is a moral question whether you should listen very much to the desires of those who do not want any more children and who say, "Now do not allow the other one to become diseased." I think it is a moral question whether the surgeon should consent to be guided by the wishes of a woman in this case and remove a perfectly healthy ovary; I never do so. And I have said, if there is no suspicion of disease, I will not remove it.

With regard to the frequency of recurrence, Dr. Thomas has remarked that it is much greater than one in fifty. In my practice it is much less than one in fifty—rather more than that. I certainly think, making all admissions for the possibility of cases being operated upon by other surgeons, that the allowance of one in fifty is a very broad allowance indeed.

I quite agree with Dr. Goodell, that where the ovaries are of no use and in old women, it is right to remove them if you can do it without adding to the risk, but there is some addition to the risk, although it may be slight.

THE NEW CÆSAREAN SECTION.

WITH REPORTS OF THREE SUCCESSFUL CASES.

By William T. Lusk, M.D.,
New York.

A number of years ago I had occasion to make a special study of a large number of the reported cases of Cæsarean section, and was greatly impressed with the unfavorable conditions under which they, for the most part, had been performed. It then seemed to me certain that a plan would be devised by which the operation would benefit by the experience won in other departments of abdominal surgery, and that the time was not far distant when the opprobrium under which it rested would be removed.

The revolution that has since taken place we certainly owe Dr. Sänger. The question as to the originality of his suggestions is entirely irrelevant. While the great body of the profession was still engaged in the task of showing that the Cæsarean section had profited nothing by the recent advances in surgical science Sänger, in his exhaustive treatise entitled *The Cæsarean Section in Cases of Uterine Fibromata—Criticisms, Studies, and Propositions for the Improvement of the Cæsarean Section*, formulated a series of rules concerning the employment of the uterine suture which he invited obstetricians to put to the test of experience. In this work he gave most generous credit to Lundgren, Polin, Jenks, Brickell, and Harris. It is true that many of the suggestions originally made by Sänger have since been modified. The subperitoneal exsection of narrow strips of muscular tissue from the

borders of the uterine incision, upon which he laid great stress, has been found unnecessary in practice. But it remains a fact that Sänger's work, on its appearance, excited widespread interest in Germany. The challenge to test its principles was promptly accepted, and the triumphant results are a matter of common fame. The hateful mutilating operation of Porro has been restricted within narrow limits, and the croakings of the anti-Cæsarean school are no longer heard.

To belittle Sänger's achievements is to follow historic precedents. On the fly-leaf of one of the earliest printed Bibles some one wrote, more than two centuries ago, "If Melanethon had not piped, Luther had not sung." Or, to come down to what is within the memory of most of us, there were scholarly men twenty years ago who denied to Marion Sims all credit as the discoverer of the surgical cure of vesico-vaginal fistulæ, and insisted that in each one of the steps which led to success he had been anticipated by others.

For my own part, in presenting to this Society the histories of three successful cases of Cæsarean section performed within little more than a year in the Bellevue Hospital, it is my highest pleasure to acknowledge my obligations to Sänger, and to add my tribute to the glory he has justly won.

As my first case (March 22, 1887) has already been reported, I shall content myself with briefly recalling its more important features:

The patient had suffered in childhood from hip-disease, and, in consequence of the resulting ankylosis of the right sacro-iliac articulation, marked pelvic obliquity existed. There was extreme transverse narrowing, and, owing to the coincident projection of the promontory, the conjugate diameter was reduced to less than three inches. It was not impossible to have removed the child by craniotomy, but as the risks of extraction through the natural passages, where the transverse and antero-posterior diameters are both materially narrowed, are always great, and as the patient was otherwise healthy, and labor had just begun, I concluded, after consultation with Drs. Taylor and Garrigues, to resort to

the Cæsarean section. The operation lasted an hour and fifteen minutes. The highest temperature (102.8° F.) occurred on the fifth day, but dropped to 100.5° F. after a spontaneous evacuation of the bowels. On the eighteenth day a large abscess was found at the site of old sinuses upon the right hip. After this had been lanced the temperature fell, and continued without further disturbance at the normal point. From the second day the patient took an abundance of liquid food, with tea, toast, and eggs at the end of the week. Had it not been for the hip complication the period of puerperal convalescence would have compared favorably with that of an easy, natural labor. The mother has since had to support herself by hard labor, and the child, which weighed seven pounds at birth, is in a thriving condition.

Dr. Harris reports that this was the second successful Cæsarean operation in the city of New York, the first one having been performed in 1838.

In the two operations I have now the honor to report the indications were positive. As a matter of choice, I would gladly have avoided the Cæsarean operation. The fortunate issue in each case furnishes, therefore, the strongest evidence in favor of Sänger's method.

Case I.—Harriet S.,[1] aged thirty-eight, born in the United States, admitted to Bellevue Hospital October 6, 1887. The patient had been married seventeen years, and had previously given birth to four children, the youngest of which was two and a half years of age. Since the birth of the last child she has suffered from pains in her back, profuse menstruation, and leucorrhœal discharge. For the past eighteen months the pains have increased in severity, and the vaginal discharges have become profuse, watery, or sero-sanguinolent in character, and extremely offensive.

In the beginning of March she menstruated for the last time, and afterward had morning sickness and other signs of pregnancy. In June she came to the city and consulted Dr. Thomas, who

[1] Report of operation from notes furnished by Dr. R. W. Greene. Report of subsequent history from notes furnished by Dr. W. K. Tingley.

found her suffering from advanced carcinoma. After I had read my paper on the "Prognosis of the Cæsarean Operation" before the Obstetrical Section of the International Medical Congress, which met at Washington in September, 1887, I was consulted by Dr. Robb, of Amsterdam, her physician, concerning her case, and it was decided that she should be sent to Bellevue Hospital to be under my charge during the continuance of her pregnancy.

On admission the patient was found to be pale and cachectic. The enlargement of the abdomen corresponded to the eighth month of pregnancy. Fœtal movements could be distinctly felt, and the heart-sounds were well defined.

On examination the cervix, bladder-wall, and the upper portion of the vagina were found in a state of advanced cancerous degeneration. The os formed an indurated ring which permitted the passage of the index finger to the membranes and the child's head. As, however, the extent of the disease rendered it impossible to extract the child at the time of labor without the removal of an amount of tissue, and a degree of injury to adjacent organs that must certainly have proved fatal, it was decided to place the woman under observation, and perform Cæsarean section when gestation should reach its end.

With this object in view the patient was put upon tonics and supplied with an abundance of nutritious food. The vagina was douched twice daily with Labarraque's solution. As a consequence of these measures the fetidity of the discharges diminished and the general condition improved.

On the 25th of October the patient first complained of pains in the lumbar region and sacrum, which examination showed were due to uterine contractions. These continued at variable intervals until the 31st of October. From the 27th of October there was a nearly continuous discharge of watery fluid from the vagina.

On the 30th of October a cathartic was given, a bath administered, and the patient was restricted to a milk diet.

On the 31st of October, the day of the operation, the uterine contractions were attended with rather profuse bloody discharges.

The administration of ether was begun by Dr. Anderton at 2.58 P. M. by means of the Clover apparatus, and in four minutes anæsthesia was complete. Dr. Tingley then shaved the pubes,

and washed the abdomen with bichloride solution in the usual manner.

The following particulars of the operation are from notes taken at the time by Dr. R. W. Greene: The abdominal incision was made at 3.7, and extended from a point four inches above the navel to the symphysis. Three sutures were introduced through the abdominal walls above the navel in order to close that portion of the wound after lifting the uterus from the abdominal cavity. The uterus was turned out of the opening by its left border at 3.14. An elastic ligature was loosely applied around the lower uterine segment below the child's head at 3.15. Incision in uterine wall and through membranes was completed at 3.17. The arm presented at incision. The child was extracted at 3.18 and given to Dr. Braisted for special care. The membranes were adherent. The placenta was extracted at 3.22. The elastic ligature was relaxed and a carbolized stream was employed to wash out the uterus and vagina. At this time the patient's condition was good. Thirteen deep wire sutures were placed in the uterine walls, and the peritoneal borders were brought into careful contact by means of sixteen superficial silk sutures. For the latter purpose the Lembert stitch was employed. The closure of the abdominal wound was completed at 4.14 The total duration of the operation was one hour and seven minutes. Toward the close of the operation shock was well pronounced. For this eight hypodermics of whiskey were administered, and a nitrite of amyl inhalation was given before the patient was placed in bed. As the patient was markedly cyanosed and the respirations were shallow, oxygen was administered for twenty-five minutes. In an hour consciousness returned, and at 6.45 the patient was comfortable.

At no time subsequent to the operation did the patient suffer from nausea or vomiting. Rectal enemata were administered for twenty-four hours, but from the second day she partook freely of tea, bouillon, brandy, ice, milk, and carbonated drinks by mouth. The temperature-range for the first three days varied from 99° to 102$\frac{1}{5}$° F., from which time it remained at nearly the normal point. There was some tympanites on the fifth day which was relieved by a rectal injection of a chamomile infusion. The bowels were moved on the eighth day with calomel (gr. iij) and a half ounce of Rochelle salts. The abdominal stitches were

removed on the tenth day. Primary union had taken place throughout the entire length of the wound.

After the operation the carcinoma made rapid progress. The discharge became profuse, sanguinolent, and excessively offensive. A good deal of mental disturbance, at times rising to mild mania, developed during convalescence.

On the twenty-third day the patient was able to sit up. On the 24th of December she returned home, but died eight days later from exhaustion due to the progress of the cancerous affection.

The child was born still, but was resuscitated with some difficulty by Dr. Braisted. It weighed six pounds at birth. For a few days it was fed on condensed milk, and then a wet-nurse was obtained. It has since thriven, and has never had a day's illness.

In reviewing this case, a word of warning may not be out of place. The cyanosis which was very marked after the operation, and which in the history is referred to shock, I believe in reality was due to repeated hypodermic injections of ergotine. These were administered at a time when the uterine circulation was arrested by the rubber ligature, and, as a consequence, when no effect upon the uterine muscle was possible. If, therefore, the cyanosis was the result of ergotism, the sequence illustrated the need of careful instructions as regards minute particulars to assistants prior to the operation.

Again, in reference to the mental derangement manifested by the patient, it is interesting to note that a similar disturbance was reported by Leopold as occurring in one of his patients, upon whom the Porro operation had been performed because of obstruction due to cancer of the inferior uterine segment. The symptoms developed on the fourteenth day, and on the thirty-third day the woman was removed to an insane asylum.

Case II.[1]—Elizabeth L., aged twenty-six, born in England, admitted to Bellevue Hospital November 21, 1887. The patient

[1] Report of operation by Dr. J. Clifton Edgar. Report of subsequent history by Dr. E. J. Lorenze.

was excessively pale and emaciated. Her pulse was 136, her respiration 36 and shallow, and the temperature by mouth was 102°. The mouth and tongue were brown, with sordes on the lips and gums. It was ascertained that labor began on the 15th instant, at 1 A. M.—*i. e.*, six and a half days previously. On the 17th the patient was greatly exhausted from pain and loss of sleep. A large dose of opium procured temporary relief, but the following day the pains returned, and continued up to the time of the patient's entrance into the hospital. On the 20th instant the membranes ruptured.

Examination showed the evidences of early rickets. The patient's height was fifty-seven inches. The forehead projected. The distance between the spine and crests of the ilia was each nine and a half inches. The external conjugate measured six inches. The diagonal conjugate was three and a quarter inches, and the estimated conjugata vera was two and a half inches. The distance between the ischia was two and a quarter inches. The pelvis belonged, therefore, to the flattened rachitic variety, with marked narrowing in the transverse diameters. In spite of the long continuance of labor the os was barely dilated to the size of a dollar.

In the woman's deplorable condition scanty hopes were entertained of saving her life by any obstetrical procedure. The extraction of the child by the natural passage after resorting to craniotomy and embryotomy could only have been accomplished through so narrow a pelvis after a long and difficult operation, which, in the exhausted state of the mother, would assuredly have proved fatal. At the same time it seemed hardly fair to burden the statistics of the Cæsarean section with a case apparently so hopeless. As, however, the heart of the child could be detected feebly beating, it was decided to resort to the ventral operation in the expectation of, at least, preserving the child's existence.

The patient was placed under ether at 2.8 P. M. Ether administered by Dr. Tingley. Pubes shaved; abdomen washed with soap and water, then with sol. hydrarg. bichlor. (1 : 3000), and finally with ether. Operation was begun at 2.15. The abdominal incision was made to extend from two inches above and to the left of the umbilicus to the pubes. At 2.18 the uterus was lifted from the abdominal cavity, and was held at right

angles to the body by Dr. Lorenze. Protrusion of the intestines was prevented by a large flat sponge placed beneath the abdominal walls, and behind the uterus. A rubber ligature was placed loosely around the cervix, just below the child's head. The uterine incision, four and a half inches in length, was made in the median line midway between the cervix and fundus. The occurrence of considerable hemorrhage made it necessary to tighten the rubber ligature. The child's knee presented at the opening. The child was extracted by the extremities, and at 2.20 was handed to Dr. Braisted for such care as might prove necessary. At 2.21 the placenta was removed. The entire decidua was found in a necrosed condition, and formed a grayish pulp, which had to be removed piecemeal by the fingers. The uterine cavity was then thoroughly washed out with Thiersch's solution, and the internal surface was dusted over with iodoform. This part of the operation caused a delay of twelve minutes. At 2.33 P. M. the deep silver sutures, seven in all, were introduced. At this stage the heart became weak, and a drachm of whiskey was injected into the right thigh. At 2.50 the silver sutures were adjusted, and the uterine wound was closed. Nine superficial sutures of fine silk were then employed to bring the peritoneal surfaces into apposition. At 3 P. M. the external surface of the uterus was carefully washed with Thiersch's solution and returned to the abdominal cavity. The cleansing of the abdominal cavity and the closure of abdominal walls was completed at 3.15. The total duration of the operation was one hour. At 5 P. M. the temp. was 100°, pulse 120, resp. 22, and the general condition of the patient was fair.

The next morning, November 22d, the temp. was 100.8°, pulse 122, resp. 20. In the evening the temp. rose to 102.2°, pulse 130, resp. 25.

November 24. Morning temperature 101.6° F., pulse 120, resp. 24. At 9 P. M. Temp. 102.5°, pulse 127, resp. 25.

24th, 9 A. M. temp. 102.4° F., pulse 128, resp. 22. At noon, on account of perceptible odor to the lochia, an intrauterine douche (sol. sub. cor. 1 : 3000) was given, and was followed by the introduction into the uterus of a suppository containing 100 grains of iodoform. At 9 P. M. temp. 102°, pulse 126, resp. 27.

25th at 4 A. M. temp. 103° F., pulse 130, resp. 27. Under

hourly five-grain doses of antifebrin the temperature fell to 100.8°.

26th at 9 A. M. temp. 102.5° F., pulse 130, resp. 22. At this time I was absent for a day from the city. My house physician detecting, as he supposed, a fetid odor in the line of the abdominal wound, withdrew three of the stitches, which was followed by the discharge of a small quantity of pus. At 8 P. M. the temperature rose to 104.6° F., pulse 160, resp. 35. The following day the abdominal wound parted so as to expose the anterior surface of the uterus. The peritoneal covering was healthy and glistening, and complete union of the uterine wound had taken place. The apposition of the peritoneal surface appeared to be perfect. Indeed, the sutures alone marked the line of the incision. In consequence of this exposure plastic exudation was subsequently thrown out, by means of which the uterus and the abdominal walls became agglutinated. The wound closed slowly by granulation. No general peritonitis followed. Indeed, there was no evidence that the abdominal cavity, as a whole, was exposed in consequence of this misadventure. There was, however, some local peritonitis, as was shown at a later period by the formation of a retrouterine abscess.

On the night of November 28th the weather changed suddenly and became very cold. The patient was unruly and insisted upon throwing the bed-coverings from her chest and shoulders. The next morning she had general bronchitis. Pneumonia followed, attacking first the left lung, and eventually invaded the entire right lung. Up to this time the patient's general condition had not appeared unfavorable. During the progress of the lung complication many alarming symptoms developed. At times the patient suffered from extreme dyspnœa, from cyanosis, and from œdema of the lungs. The temperature ranged from 102° to 104° F.; pulse from 130 to 160; respirations from 35 to 50; the tongue was dry, red, and glazed; a bedsore formed on the sacrum; an abscess developed in the left thigh; and excessive anæmia added to the critical condition.

On December 13th resolution began. The temperature fell to 99.8° F., pulse 138, resp. 45.

On December 14th thrombosis of the left femoral vein developed, associated with pain and slight swelling of the leg. The

patient was delirious; the pulse was 150, and she suffered from frequent attacks of dyspnœa and cyanosis, due to excessive feebleness of the heart.

December 27th an effusion was detected situated behind the uterus, and extending down between the vagina and the rectum to the pelvic floor. December 29th a spontaneous discharge of pus took place through the vagina, which was followed by a complete disappearance of the swelling.

From this time the patient improved rapidly, and was discharged from the hospital cured on the 14th of February. She has since returned frequently for observation, and enjoys excellent health. The uterus is small and adherent to the abdominal walls.

The infant lived only thirty-six hours, death occurring from trismus.

The happy result in this case was due to the devoted zeal of the nurses in charge and to Drs. Lorenze and Coakley, the hospital physicians. Upon Dr. Lorenze the chief charge devolved. Night after night he spent at the patient's bedside. The utmost fertility of resource was shown in attacking the untoward symptoms. Excessive temperatures were controlled by antifebrin, and when necessary by the rubber coil; the heart-action was sustained by brandy, digitalis, tincture of strophanthus, and nitro-glycerine; the pulmonary œdema was relieved by dry-cups and large flaxseed poultices; the dyspnœa by tincture of chloride of iron and chlorate of potash. Meat-solutions, milk, and stimulants were administered by the stomach. Nutritive rectal enemas were not retained.

A few days previous to the operation upon Lovell, I had occasion to perform craniotomy in the case of a woman who had likewise been a number of days in labor. The waters had escaped, the uterus was closely retracted upon its contents, the pelvic narrowing was of moderate extent, and the extraction of the child with the cranioclast was not an act of difficulty, but the woman died at the end of a week of septicæmia in spite of the employment of every usual antiseptic precaution. A hint as to the probable cause of the sepsis is fur-

nished by the necrosed condition of the decidua which existed in Lovell's case; the death of the tissue evidently resulting from the long-continued pressure of the inner uterine surface upon the body of the child. An examination of the local condition showed quite clearly that any attempt to remove the dead tissue by intrauterine irrigation would have proved ineffective. It seems to me certain that Lovell's recovery was made possible by the careful detachment of the decidua with the fingers, and by the subsequent thorough disinfection of the inner surface, which the uterine incision enabled me to carry out in an intelligent manner.

The removal of the abdominal sutures on the fifth day was an error. The absence at the time of any trace of peritoneal irritation indicated that the pus was of mural origin. The local peritonitis which ensued upon the exposure of the uterus was the cause of the pelvic abscess which, at a later period, complicated convalescence.

But none of these accidents seriously threatened the patient's life. The lung trouble which so nearly proved fatal was not septic, but the result of exposure. The sudden and extreme fall in the temperature during the night of the 28th was the responsible cause of the general bronchitis and the ensuing catarrhal pneumonia.

The vogue which recent triumphs have given to the Cæsarean section makes it important to bestow special attention upon the indications for the operation and the conditions of success. In this task I invite the aid of this Society, and beg that its members, either by the contribution of individual experiences or by criticism, may serve to guide those who wish to avoid failure, and to exercise restraint upon such as might be led by over-confidence needlessly to imperil valuable lives.

Now at the outset there are certain general principles with regard to which nearly all are in practical agreement.

In flattened pelves measuring $2\frac{1}{2}$ inches or less in the conjugate diameter, the risks of craniotomy equal if they do not exceed those of the Cæsarean section—the only exception

to this rule occurring in cases in which a nearly normal transverse diameter coincides with extreme conjugate narrowing, an exception so rare as practically to be excluded from consideration. In justo-minor pelves with even 3 inches in the conjugate, mortality statistics show a death-rate, where embryotomy has been resorted to by expert operators, which the tyro would hardly equal were he to avail himself of the Cæsarean section.

With a pelvis measuring $3\frac{1}{2}$ inches in the conjugate, the expulsion of the child by the natural forces is to be expected.

In flattened pelves with a conjugate between 3 and $3\frac{1}{2}$ inches, and in justo-minor pelves with a conjugate of at least $3\frac{1}{3}$ inches, there is ample field for the exercise of all the resources of obstetric art. Within these limits labor induced at the thirty-fourth or thirty-fifth week furnishes a fair chance of saving the life of the child without imperilling seriously the life of the mother. In many cases, too, even when the woman has gone to full term, spontaneous expulsion of the child is possible, provided the child is of medium size, the head easily moulded, and the transverse pelvic diameter not disproportionately diminished; or, even if the natural forces are inadequate to the work of expelling the child, they in many instances suffice so far to engage the head at the superior strait that the further work of delivery can be safely accomplished by forceps. When no engagement of the head takes place, a skilful operator may in some cases save the child by a resort to version. If conservative measures fail, a timely resort to craniotomy is still practicable, and its performance is attended with slight maternal risk.

In these minor degrees of pelvic deformity, the Cæsarean section would, therefore, be indicated only when craniotomy had been found necessary in antecedent pregnancies, and the eager desire for a living child leads the mother to urge its performance.

But between $2\frac{1}{2}$ and 3 inches in flattened pelves, or $3\frac{1}{3}$ inches in justo-minor pelves, the question of choice between

craniotomy and the Cæsarean section is debateable. The birth of a living child by the natural passages in pelves measuring a fraction less than 3 inches is not absolutely impossible. Still, the exceptions are so rare that they cannot be taken into account in determining rules of practice. At full term it is proper indeed to allow labor to proceed for a time, to test the adaptability of the head to the superior strait. But if, after a few hours, the head remains above the brim, the alternatives for effecting delivery are craniotomy or the Cæsarean section. In making an election between these methods, it is not right to ignore the superior value of the mother's life. The recent improvements in Cæsarean statistics have, however, led to the inquiry whether it may not be possible in these higher degrees of pelvic contraction to do away altogether with embryotomy and its sickening concomitants. Before investigating this point carefully, I had believed that such would prove to be the case. Dohrn had reckoned that in private practice the death-rate from craniotomy was 27 per cent. In a letter received from Dr. Harris dated August 18, 1888, he informs me that in 65 Cæsarean operations performed in German cities there were 9 deaths, or a death-rate of a little less than 14 per cent. Moreover, 60 of the 65 children were born living. But such a comparison is an illustration of the misuse of statistics. Dohrn's calculation does not belong to the antiseptic period, and no operation has benefited more by antisepsis than that of craniotomy. Thus in Praeger's recent monograph[1] we learn that since the adoption of modern methods in hospital practice, Olshausen reports a death-rate from craniotomy of 5.7 per cent., Credé a death-rate of 8 per cent., and Leopold of 2.8 per cent. Leopold had 71 cases with 2 deaths. The latter were from eclampsia, and were hopeless from the outset. Gusserow reports from Berlin a death-rate of 14.3 per cent., or, excluding cases in which the death had nothing to do with the operation, the death percentage was reduced to 8.3.

[1] I. Praeger. Der Kaiserschnitt, etc., hesausgegeben von Dr. G. Leopold.

In Dr. Harris's report concerning the Cæsarean section, to which reference has been made, the total number of cases performed in different countries had reached at the time of his writing 130 with 35 deaths, showing a mortality of 27 per cent. Wyder,[1] in advocating the claims of craniotomy, properly maintains the right to exclude from his statistics cases of rupture of the uterus, of deaths due to antecedent, improper forceps applications, and cases in which septic infection from outside sources had destroyed in advance every hope of a successful issue. The same principle applied to the Cæsarean section, as I have already endeavored to show,[2] would contribute to relieve greatly the sinister aspect of its death-rate, but even after making every allowance, it is necessary to admit sorrowfully that in equally competent hands craniotomy is at this moment a less perilous operation than the Cæsarean section. Even in cases of pelves measuring less than 3 inches, the recent showing for craniotomy has been unexpectedly satisfactory. Thus in Wyder's report of the Berlin clinic 25, and in Leopold's list 17 belonged in this category. Every one of the 42 patients recovered.

Fair treatment to those whose lives are entrusted to our care demands, therefore, that in these higher degrees of pelvic deformity the comparative risks of craniotomy and the Cæsarean section should be honestly represented to the patient and her friends, and to them should be left the final decision. But the maternal instinct is strong, and where the odds are not too great will usually outweigh prudential considerations.

In the irregular forms of pelvic contraction, and in obstructions due to carcinoma or to uterine and pelvic growths, it is useless to attempt to formulate rules. The conduct in each case is necessarily dependent upon individual peculiarities, and must be governed by the personal judgment of the physician in charge.

We have just remarked that in a certain proportion of cases

[1] Wyder. Perforation, Kunstliche Fruhgeburten und Secto Cæsarean in ihrer stillung Zur Therapie brim, Eugen Becker.

[2] The Prognosis of the Cæsarean Section. Trans. Ninth International Congress.

of difficult labor it becomes the duty of the physician to state to his patient the comparative dangers of craniotomy and of the Cæsarean section, and that to the woman should be left the liberty of deciding whether she is willing to undergo the added peril of the latter operation for the sake of a living child. The physician, in acting as an adviser, assumes a solemn responsibility. Encouragement to select the more heroic measure must depend upon recorded results. Let us recur once more to Harris's report (Aug. 18, 1888):

Total number operated upon, 130; general average saved, 72 per cent.; German operations, 65; percentage of women saved, $86\frac{2}{13}$.

In Dresden there have been 20 cases, with 2 deaths; in Leipsic, 13 cases, with 1 death—or together 33 cases, with 3 deaths.[1]

Percentage of women saved, 91 per cent.

It would be interesting to know how many childless women, when told that their chances of recovery after Cæsarean section were as nine to one, would consent to the destruction of their unborn babe.

I append herewith a table of American operations, which again I owe to Dr. Harris.

No.	Date.	Operator.	Locality.	Woman.	Child.
1	Nov. 6, 1882	Dr. H. J. Garrigues,	New York,	Died.	Died.
2	Dec. 26, 1883	" Charles Jewett,	Brooklyn,	"	Living.
3	Nov. 12, 1884	" J. M. Drysdale,	Philadelphia,	"	Died.
4	Sept. 6, 1885	" J. R. Weist,	Richmond, Indiana,	"	Living.
5	Sept. 20, 1885	" W. H. Parish,	Philadelphia,	"	Died.
6	Dec. 16, 1886	" H. F. Biggar,	Cleveland, Ohio,	Living.	Living.
7	March 2, 1887	" W. T. Lusk,	New York,	"	"
8	May 1, 1887	" J. T. Johnson,	Washington, D. C.	Died.	"
9	May 29, 1887	" Justus Ohage,	St. Paul, Minn.	"	"
10	Oct. 23, 1887	" J. G. Jay,	Baltimore,	Living.	"
11	Oct. 31, 1887	" W. T. Lusk,	New York,	"	"
12	Nov. 21, 1887	" W. T. Lusk,	New York,	"	"
13	Dec. 11, 1887	" L. Ernest Neale,	Baltimore,	Died.	"
14	Jan. 13, 1888	" R. B. Norment,	Baltimore,	"	"
15	Feb. 24, 1888	" H. J. Garrigues,	New York,	Living.	"
16	March 1, 1888	" W. M. Polk,	New York,	Died.	"
17	March 6, 1888	" W. W. Jaggard,	Chicago,	Living.	"
18	March 19, 1888	" H. H. Ninke,	St. Charles, Missouri,	Died.	"
19	April 17, 1888	" H. A. Kelly,	Philadelphia.	Living.	"
20	May 30, 1888	" H. A. Kelly,	Philadelphia.	"	"
21	Feb. 21, 1888	" J. H. Etheridge.	Chicago,	Died.	?

[1] Leopold. Der Kaiserschnitt, etc., p. 148. There is no reason for supposing that Leopold's two fatal cases could have been saved had craniotomy been employed.

To this list should be added two recent fatal cases, one occurring in the practice of Prof. Polk, of New York, and one in that of Dr. Willard, of Seattle, Oregon. Thus, there have been in this country 23 cases with 14 deaths. Of recoveries there have been not quite 40 per cent.

This is not a pleasant record. It is calculated to paralyze the intending operator, and to extinguish hope in the patient. Undoubtedly many of the operations were performed under very unfavorable conditions. In spite of all that Harris has written, tardy diagnosis, and the late resort to measures of surgical relief are still errors that heavily weight American Cæsarean statistics. The requirements for better results are the recognition of the obstruction to the parturient canal early in the labor, or, better still, before the end of pregnancy, proper preparation of the patient, adequate assistance during the operation, complete antisepsis, and skilled nursing. When these requirements are not fulfilled the Cæsarean section is not a scientific measure, but a gambling with life.

If every physician would make himself acquainted with the very moderate requirements for the recognition of pelvic deformities, and would regard it as a professional duty in first pregnancies to investigate the pelvis and its contents before the advent of labor, an important source of evil could be avoided. His patient could then be prepared, in case the Cæsarean section was indicated, by full baths, by disinfecting vaginal douches, by laxatives, by diet, and by tonics for the serious shock to which her system would have to be subjected. When labor sets in he would await the canalization of the cervix, which is usually sufficiently advanced at the end of from four to ten hours. If the labor comes on at night, it is best to defer the operation until the coming of daylight. Needless vaginal examination should be avoided.

The necessary preparations should meantime be made, and selected assistants should have explained to them their respective duties. There should be one assistant to take charge of the anæsthesia, one to hold the uterus after it has been turned

out of the abdominal cavity, one for the instruments, one to take charge of the newborn child, and, if still, to aid in its resuscitation, and a trained nurse to wash and keep account of the sponges.

Few instruments are required. The entire armamentarium should consist of one or two scalpels, a pair of blunt-pointed scissors, a half-dozen compression forceps, a needle-holder, curved needles, an irrigator, a powder-blower, aseptic towels, and vessels containing an abundance of warm carbolized water. The sponges should be aseptically cleaned,[1] and carefully counted. A piece of rubber tubing will be needed to place around the lower uterine segment to control the hemorrhage when the uterus is incised. For ligatures, silver wire, silk, and catgut have each their advocates. In my first case I used silk alone, and in the other silver (No. 29) for the deep, and fine silk for the symperitoneal sutures. Leopold prefers chrome catgut,[2] a large size for the muscular walls, and a fine one for a continuous suture to approximate the peritoneal borders. At the time of operation instruments, sponges, wire, and silk should be placed in a two per cent. solution of carbolic acid.

The operator and his immediate assistants should thoroughly wash their hands and forearms with soap and water. The nails should be cleaned with a nail-brush and nail-cleaner, and finally, once more, the hands and arms should be bathed for several minutes in 1 : 1000 solution of corrosive sublimate. During the operation clean white aprons should be worn.

Preliminary to the operation, the patient's bowels and

[1] To render sponges aseptic they should first be boiled in a weak solution of soda, and washed out in boiled water. They should then be soaked for two hours in a solution of permanganate of potash (1 : 4000), and, after repeated washings in a 4 per cent. solution of hyposulphite of soda, to which 3 to 4 per cent. of muriatic acid has been added, should be preserved in a 5 per cent. solution of carbolic acid. Zweifel, Arch. f. Gyn., vol. xxxi. p. 204.

[2] Catgut should be immersed forty-eight hours in a 10 per cent. solution of carbolic acid, then placed for five hours in a ½ per cent. solution of chromic acid, and afterward should be preserved in absolute alcohol. Mikulicz.

bladder should be emptied, and the vagina should be douched with a five per cent. solution of carbolic acid. During the induction of anæsthesia, pains should be taken to make sure that the auscultatory signs of fœtal life are present. After the patient has been placed upon the table, the pubes should be shaved, and the abdomen should be cleansed in the usual manner with soap-suds, corrosive sublimate solution, and ether.

The abdominal incision should be made to extend from a point above the pubes to one three or four inches above the navel. At this stage it is convenient to pass a half-dozen long wire sutures through the upper portion of the incision. For the moment the ends should be left free. The child can be removed from the uterus *in situ*, but it is a great convenience first to turn the uterus out of the abdominal cavity. This is accomplished without much difficulty, by first tilting the uterus so as to cause its left border to present at the incision, and then pressing the abdominal walls backward over the uterus. As it emerges the assistant should envelop it in a warm carbolized towel, and hold it at nearly right angles to the abdomen. The operator now tightens the sutures in the abdominal incision to retain the intestines, and places a flat sponge beneath the abdominal walls behind the uterus to prevent the entrance of fluids into the peritoneal cavity. The rubber tubing should be placed loosely around the lower uterine segment beneath the presenting part. I prefer, instead of beginning at the fundus, by a series of rapid strokes first to make a small incision down to the membranes in the median line just above the lower segment, and then to extend the incision rapidly upward with a pair of blunt-pointed scissors. If the placenta is encountered, it should be detached with the fingers and pushed to one side. The uterine incision should be between four and five inches in length. If the membranes are intact, they should be ruptured, and the child should be rapidly extracted. The rubber ligature should be tightened, and the remainder of the operation should be rendered blood-

less. As the uterus retracts the assistant sees that the abdominal incision is kept in close contact with the uterine surface. With a little care no blood or fluid need obtain entrance into the abdomen during the entire operation.

In many cases the membranes peel off intact with slight traction, and come away with the placenta. Adherent portions of decidua should be carefully detached with the fingers. I have found it easy to wash out the uterine cavity with a disinfectant fluid, by placing the irrigator nozzle in the wound and pressing the cut surfaces together while loosening for the moment the elastic ligature. The pressure of the hands prevents hemorrhage, and the stream passes out unimpeded through the vagina. When this has been done, the uterine cavity should be sponged nearly dry, and the inner surface powdered over with iodoform by means of an insufflator.

The uterine incision should be closed by two sets of sutures, a stronger one of wire, silk, or catgut for the muscular structures, and a fine one of silk or catgut to approximate the peritoneal borders. The muscular sutures should be introduced one-half inch from the borders of the incision, and passed obliquely downward to, but not including, the decidua. Of these, eight to twelve are usually necessary. For the peritoneum I have used an interrupted suture of fine silk, and have employed with great satisfaction the Lembert stitch to secure close union. Leopold advocates catgut for both deep and superficial sutures, on the ground that they produce less subsequent irritation; but care must be taken to secure catgut of good quality, and to tie the deep sutures with three knots.

After the suturing is completed, a hypodermic injection of the fluid extract of ergot should be made into the skin of the outer surface of the thigh. The elastic ligature should then be loosened, and manual compression maintained until firm contractions have been secured. After replacing the uterus, the abdominal wound should be closed without haste, and with punctilious care. A full antiseptic dressing should be applied. The patient, finally, should be placed in bed with hot bottles

around her, and, in case of failing heart-action, the usual restoratives should be applied.

As vomiting after the Cæsarean section is rare, the administration of liquid food by the stomach is possible almost from the first. Tympanites is sometimes distressing, but can often be relieved by injections of soap-suds in chamomile infusion, while in severer cases a calomel laxative may be administered (gr. ijss every five hours until action is produced). The abdominal stitches should be removed from the twelfth to the fourteenth day. In favorable cases the patient may sit up by the middle of the third week.

For the first few days I keep a trained nurse and a young physician in constant attendance, and my own visits are at frequent intervals. Every change is constantly noted. Promptness in meeting emergencies counts for much in securing the favorable result.

In conclusion, it may be proper to state that if the patient's condition at the outset was fairly good, and the operation was performed with every attention to detail, such as a well-equipped hospital renders possible, and the after-management was intelligently conducted, the prognosis is hardly doubtful. Recovery will almost certainly follow, and a new triumph will add to the fame of Sänger.

But if the patient has been operated upon in her own home, after a lingering labor, without needed assistance, perhaps by the light of a kerosene lamp, and with preparations of a makeshift character, and after the work is ended she is left to the care of ignorant, prejudiced persons, it may be proper to call the operation by the name of Sänger, but recovery, if it occurs, must be regarded as partaking of the nature of a miracle.

DISCUSSION.

Dr. Howard A. Kelly, of Philadelphia, was called upon by the President to open the discussion.

Dr. Howard A. Kelly, of Philadelphia.—Your call upon me, Mr. President, is so utterly unexpected that I rise with much hesitation to discuss this most important question.

I must, first of all, congratulate Dr. Lusk upon his wonderful success in these three cases, breaking America's bad hospital record, and proving that even in our big public hospitals this greatest capital operation can be conducted with safety. My own experience this year embraces two cases, one operated upon in private, the other in the Kensington Hospital for Women, both also successful. The first case was one of extreme interest, as the patient had been two weeks in labor, and the waters had ruptured four days before the operation; yet, in spite of her condition, she made a rapid and almost undisturbed recovery.

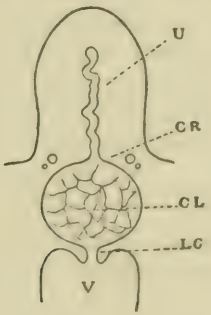
Upon the 17th of April last I was called to see Mrs. J., a delicate American, twenty-five years old, four feet four inches in height. She fell in labor on the third instant, and was attended by a midwife, who, finding that she had very strong pains and that labor did not progress, sent, after five days, for her physician, who remained with her more or less constantly until the 17th, when he summoned me to operate. Drs. Ireland and Starck, who were in attendance, had made careful manual efforts to dilate the cervix, but had wisely refrained from instrumental interference. I went to her at their call accompanied by Drs. R. P. Harris, and Prof. Gardner, of Montreal, who were visiting me at the time. We found the patient profoundly collapsed, with a thready pulse of 142.

The pelvic measurements were: sp. i. 19 cm., cr. i. 25 cm., external conjugate d. B. 15 cm. It was impossible to measure the diagonal conjugate as the pelvis was choked by dense inflammatory masses, in the middle of which the small rigid cervix was embedded. The indication was plain that, without any reference to the condition of the child, the only chance for the mother was Cæsarean section. The child's heart was heard

beating very feebly in the left flank The house was a two-story frame building, in an alley in a densely crowded poor part of the city.

I operated with instruments brought from my hospital, and sterilized hands and cloths and field of operation with a bichloride solution, during the operation using nothing but hot boiled water.

The operation was completed, down to the dressing of the abdominal wound in thirty-five minutes. The uterine incision struck the placenta (*plac. prav. Cæsar.*), and pushing this to one side the child's feet were grasped, and the body readily delivered. The head, however, stuck below the contraction ring, and only yielded to continued careful traction, assisted by inserting the finger in the mouth. The child was handed to Prof. Gardner profoundly asphyxiated; he resuscitated it in a half hour to a feeble vitality. It died of icterus at the end of a week.



U. Contracted uterine body. C R. Contraction ring. C L. Clots of blood accumulated in upper dilated cervical canal, and below the contraction ring. L C. Lower undilated part of the cervix. V. Vagina.

Twelve deep and twelve superficial sutures of silk were used in the closure of the uterine wound. No constriction was used upon the uterus during the operation, and no drainage was used after. The head of the child must have obstructed the rectum, for upon the day following the operation she received a dose of salts, which brought away an enormous movement filling a bed-pan.

Her pulse on the third day was 88 and her temperature normal.

She progressed without fever or distress until the contused tissues in the vagina began to break down. I then discovered that between the contraction ring and firmly contracted portion of the uterus above, and the undilated rigid infra-vaginal cervix below, in the pocket thus in the cervical canal in which the head had lain, a mass of clots had accumulated and become decomposed (see figure); this I had to wash out carefully every day. The vaginal cervix then broke down and came away in a large, crackling, emphysematous mass. Physometra also existed, until, with the breaking open of the abdominal wound and part of the uterine wound, the air discharged and I was able to syringe from above downward through the vagina. In spite of all this local disturbance her general condition was not affected, and she improved daily. In two weeks, as predicted by Dr. Harris, a mild phlebitis occurred. She now comes to my office perfectly well with a small utero-abdominal fistule through which she menstruates. The last successful case in Philadelphia was performed fifty-one years ago by Prof. Gibson.

My second case was performed on a relative indication. The mother had had two children killed in difficult labors and one very small child born living with great difficulty. She had a well-developed fœtus in utero, which I could easily have delivered by craniotomy; but at her urgent request, with all the backing of the best care in my hospital, I readily consented to attempt to save both lives. She was seen by my friends, Drs. R. P. Harris and C. P. Noble, who concurred with me in my opinion.

She was operated upon shortly after the beginning of labor. The operation lasted thirty-two minutes to completion of abdominal sutures. The child weighed within one ounce of seven pounds. She made an excellent recovery, also interrupted by phlebitis, and both mother and child are living to-day perfectly well.

I feel with Dr. Lusk that all the honors in this great renovation in Cæsarean section statistics are due to my friend, Dr. Sänger, of Leipzig, and I am sure that much of the contest for priority in this field would be avoided if writers would bear in mind that Sänger has never claimed the merits of *invention*, but of *discovery;* he was the first and the only surgeon who, by an elaborate scientific analysis of all cases in all countries, succeeded in

showing the world what among the vast number of conflicting statements were the essential factors of success.

The revolution in the results following this book of Sänger's, appearing in 1882, has been wonderful.

The operation as thus presented in its new form is simple, and I have prepared the following formula of the various steps as giving a brief but fairly complete *résumé* of the technique.

First step. Preparatory treatment of patient by baths, antiseptic vaginal douches, shaving genitals, careful attention to diet, and regulation of the bowels.

Second. Time to operate in cases of election on the border between the first and second periods of labor.

Third. Perfect aseptic condition of instruments, patient's abdomen and cloths surrounding field of operation upon which instruments lie or with which hands come in contact, by painstaking use of antiseptics beforehand, maintained by use of pure sterilized water during the operation.

Fourth. Abdominal incision above and below the navel over the most prominent part of the uterus. Bleeding vessels in abdominal walls clamped, larger vessels tied with catgut.

Fifth. Uterus left *in situ* until the child is extracted, when it can be delivered through the abdominal incision much reduced in size, emptied of amniotic fluid, fœtus, placenta, and membranes.

Sixth. Incision into the uterus about the middle, rather more toward the fundus, in a line directly under the linea alba, about fifteen centimetres in length. Lengthen upward.

Seventh. Separation of membranes from uterus before breaking them not necessary.

Eighth. Amnion emptied through abdominal walls kept from entering abdomen by hands of assistant pressing the walls close down on to the sides of the uterus.

Ninth. In placenta prævia Cæsariana do not cut the placenta. Separate to its margin and perforate membranes.

Tenth. Extract child always by feet if possible.

Eleventh. In emptying uterus carefully lift out placenta and membranes intact. Do not spend time scraping or picking off shreds of decidua.

Twelfth. Uterus now brought out of the incision and laid upon a cloth.

Thirteenth. Hemorrhage in uterine incision or from placental site best checked by hands of assistant grasping the neck of the uterus, or by clamping a provisional rubber ligature laid around the neck of the uterus. Do not ligature too tight or leave ligature on long.

Fourteenth. Intestines retained either by cloth laid over incision under uterus, or by long sutures through the upper part of the abdominal wound, or by drawing opposite edges of wound together and clamping with several pairs of forceps.

Fifteenth. Antiseptics in the uterine cavity are of very doubtful utility. Iodoform powder may limit secretion.

Sixteenth. Suture material for the uterus. Well-disinfected silk is the best. (Silkworm-gut has been used in but one case by Fasolo. Chrome catgut was used by Sänger, and ulcerated out after several months. I examined the piece and found a perfect loop and knot entirely unabsorbed. Silver wire is more difficult to handle and catgut is dangerous.)

Seventeenth. Sutures of uterus deep and superficial, the deep embracing serosa and muscularis down to the decidua, thesuperficial catching only the serosa. Do not grasp too much of the serosa.

Eighteenth. The number of sutures should be about nine deep and eighteen superficial. Do not err to the opposite extreme of using too many sutures, especially deep. The order of placing and tying is indifferent.

Nineteenth. Peritoneal toilet. Carefully cleanse the uterus now ready to be returned to the abdomen. Raise the lower angle of the wound in the abdominal wall and cleanse the vesical pouch, and the pockets in front of the round ligaments, then tilt the uterus forward and slowly and carefully cleanse Douglas's pouch, when the uterus is dropped back and a sponge or cloth laid under the abdominal incision until all the sutures are passed.

Twentieth. Drainage is very difficult, and with proper antiseptic care is unnecessary.

Twenty-first. Omentum drawn over the uterus and the abdominal wound closed with any suture material to which the operator is accustomed. I think in cases in which septic infection is feared

it is best not to pull down the omentum, as the adhesion of the uterus to the abdominal wall is conservative. Put on a permanent dressing.

Twenty-second. Time occupied in operation. This can only be a matter of serious importance in case of great exhaustion, or enfeebled vitality, as in cancer cases, or excessive hemorrhage. Everything needed should be at hand so that no unnecessary delay occur between the steps. (Prof. Gibson in his first operation upon Mrs. Reybold, working without an anæsthetic, finished in ten minutes, without closing the uterine wound.)

Twenty third. The after-treatment is most important. Having conducted the steps with precision, and secured an aseptic condition of the uterus, peritoneum, and wounded surfaces, the patient should pass through a perfectly normal puerperium. She must lie in a perfectly clean bed on cloths frequently changed, and the slightest foulness of odor or symptom of sepsis combated with very carefully given uterine douches.

The urine should be drawn for two days.

She should nurse the child if possible.

The stitches should be removed from the eighth to the tenth day, and the patient should rise in three weeks. She should long abstain from exertion or lifting.

Observation: Cæsarean section cases should be watched with extreme care during subsequent pregnancies, when labor may be conducted by being induced prematurely, or by turning, or by a repetition of the Cæsarean operation, watching with especial care to avoid the dangers of rupture.

As yet, no case of rupture has occurred in pregnancies subsequent to the Sänger method; several cases have already been operated upon twice.

Dr. G. J. Engelmann, of St. Louis.—We must not lay too much stress upon statistics in comparing the relative merits of craniotomy and the Cæsarean section, as such a course is peculiarly deceptive in this instance. There is good cause for the fatal results of craniotomy in European hospitals, and I presume that the same unfavorable conditions exist in this country; labor cases, which have lingered in filthy hovels for days, often are, as a last resort, brought to the lying-in hospital,

and there at length delivered by craniotomy; whereas Cæsarean section is, as a rule, performed upon a patient previously under observation, who has been prepared, and has, from the first, all the advantages of antiseptic surroundings. The circumstances under which the two operations are generally performed are so different that a comparison of their relative merits upon this basis is hardly admissible. For Cæsarean section we generally have the patient under favorable conditions, well prepared, whilst craniotomy is performed under circumstances much less advantageous, and yet, notwithstanding this, the results of craniotomy performed under antiseptic precautions are now even better than those of the Cæsarean operation, so that we must no longer look upon the crushing forceps as more dangerous than the knife.

For a comparison of the relative merits of these two procedures the individual case with its attendant circumstances must be taken into consideration, and statistics so often deceptive, are peculiarly liable to mislead in this case.

Dr. Henry J. Garrigues, of New York.—I have performed the Cæsarean section twice, once in 1882, and the second time less than a year ago. In the first case the indication was a kyphotic pelvis; the patient had had numerous acute and chronic diseases since childhood and an ante-partum hemorrhage which weakened her so much that she was in a half moribund condition at the time the operation was performed, and killed the child. This case was unsuccessful. The second case was one of generally contracted pelvis, and was in every respect successful; the patient did not have the slightest rise in temperature; the child and mother are both at this hour in most excellent health.

I think one of the questions of the utmost importance is whether we should choose the Cæsarean section or craniotomy. To what the author of the paper said, I would add one consideration: I think there is a great difference whether we work in a hospital or in private practice. The Cæsarean section requires very much more assistance than craniotomy does, and therefore I think that it will be found that very often in private practice, and especially in country practice, craniotomy must be performed even in some instances in which we should prefer the Cæsarean section from a surgical standpoint.

As to the sutures: I used in my second case exclusively silk sutures, and it seems to me that silk has a great advantage, it is so much easier to manipulate than catgut or silver. If an operator wants to use catgut, he must have a particular kind of catgut that is absorbed slowly; common catgut has proved thoroughly unreliable, and with all kinds of catgut the sutures have to be tied with unusual care, in at least three knots.

I quite agree with Dr. Lusk as to the value of turning out the uterus as was taught by Müller, of Berne; I did so in my last case and did not find it difficult. I had prepared a piece of gutta-percha tissue to place behind the uterus, but found that the sutures inserted in the lips of the abdominal wall before turning out the uterus, and the large flat sponges commonly used in laparotomies made its use superfluous.

There is one point on which I cannot quite agree with Dr. Lusk, and that is, the importance he accords to Sänger in regard to the Cæsarean section. In a report of cases according to his method, published by himself, my first operation is put down as the third according to that method. Now at the time I performed the operation, I did not know that a man by the name of Sänger existed, and I had never read one line that he had written. When I began to study up Cæsarean section, after I had performed that operation, I saw he had written a book which I had to write to Germany for. It could not be found in any public library in New York. I do not want to diminish his merit, he has done excellent work in a literary way, but he has only made one original suggestion, namely, to cut out slices of the uterus, and that has been found unnecessary, and I do not think anybody would do that now; even if we find that the peritoneum is so tight that it cannot be folded in, it is unnecessary to do it. It has been found so several times by Zweifel, and he simply adapted the cut edges of the peritoneum to one another.

In my opinion, those men who have given us something new are those who are entitled to our gratefulness, and if we look on the operation in its present shape, and ask what are the chief features which make us succeed better than formerly, I should say the first in importance is the antiseptic method and the second the proper suturing of the uterus. The first is due to Lister, the second to operators in this country, Dr. Moses Baker,

of Stockwell, Indiana, and Dr. S. S. Lungren, of Toledo, Ohio. The latter put in as many as twelve sutures, both folded in the peritoneum. Lungren avoided the endometrium, and both published their cases, with remarks, before Sänger began writing on the subject. Lungren has performed three such operations, all with perfect success. It seems to me that to such men should be given the credit for the improved Cæsarean section.

Dr. W. M. Polk, of New York.—It appears to me that this report of Dr. Lusk's, upon the Sänger method, is not complete without the narration of two cases operated upon by me, within the last four months. One was, in strict terms, not a case which should be recorded in connection with the Sänger method, because the woman, though operated upon by that method, was so far gone that practically her life was trembing in the balance; she had a cancerous disease filling the pelvis and involving the buttocks on both sides; her pulse was 160, and she lived only twenty-four hours; the child was saved and *now lives.*

In the other case, the patient was one that, judging from all that we know in regard to the indications of the operation, should have recovered. She had been under observation for three weeks prior to the procedure, and was fully prepared by me for it; she was operated upon when the first stage had been half completed, and the waters had ruptured, the operation taking no longer than in the cases which Dr. Lusk narrated. The patient's condition was excellent after the operation, and in seventy-two hours afterward she was dead from peritonitis. It was shown at the autopsy that the uterine wound was closed throughout. The only error that I can possibly recall in the entire process is, that I omitted to wash out the peritoneal cavity. During the operation some blood and a small amount of liquor amnii came in contact with the anterior uterine surface, with the peritoneal surface of the bladder and adjacent regions, but none remained, and after the operation I carefully examined the peritoneum and found it clean throughout. For this reason I omitted the irrigation, though the irrigating tube was actually in my hands for use. So far as the operation went, it was done with all the care that a trained staff could command. I never did a neater laparotomy. But I suppose sepsis entered from the

direction of the uterine cavity, for, be it remembered, the membranes were ruptured two or three hours. The autopsy showed pulmonary lesions; the most striking were two spots of tubercular deposit deeply seated.

Dr. W. W. Jaggard, of Chicago (present by invitation), said: It is an uncommon pleasure to hear a scholarly paper on a live issue, like Cæsarean section, by a man of such exceptional experience as Professor Lusk. The attitude that Professor Lusk assumes is judicial. The elevated tone of moderation that characterizes the essay will go far toward the removal of partisan prejudice and of erroneous notions relative to the respective indications for Cæsarean section and craniotomy.

It is reasonable to entertain the hope that with the improvements in the sanitary condition of the people in America, the indications for either craniotomy or Cæsarean section will occur less frequently. Professor Simpson remarked last year that in Edinburgh rickets was becoming very rare, while as for malacosteon the only case he had encountered for many years occurred in a non-pregnant woman. In the United States, the native-born woman very rarely presents any pelvic anomaly the effect of rachitis or of osteomalacia. Van de Warker has recently emphasized this fact. To "make experience" in either operation, we will be compelled to draw largely upon the immigrant class.

But little need be added on the subject of "the relative indication." The papers of Leopold, Wyder, and others, published during the year, show conclusively that even in Germany, under the most favorable conditions, the maternal mortality of Cæsarean section, performed under the relative indication, is still considerable; while the necessary death-rate of the mother after craniotomy, done under the same indication, has been demonstrated by Leopold to be zero. Even in Germany the time has not yet arrived when Cæsarean section can substitute craniotomy on the living fœtus in all cases. With us the total maternal death-rate of Cæsarean section is alarming. In the hands of experienced operators, it is much greater than in Germany. We cannot positively affirm that the necessary maternal death-rate of craniotomy, performed under the relative indication, is zero with us, seeing that no accurate registry of these cases is kept in the

United States. But there is a very general professional conviction that, given the essential conditions—freedom of the mother from infection, and absence of absolute pelvic contraction—the mortality is insignificant. For myself, I believe that craniotomy, performed with the proper instrument, is attended with less risk to the maternal structures than the high forceps operation. Indeed, in cases of retarded labor that indicate artificial termination—the head engaged within the inlet, the fœtus certainly dead—in these cases I believe that craniotomy, and not the forceps, is the operation of election.

If, then, the Germans, with their numerous cases and relatively slight mortality, are both unable and unwilling to substitute unconditionally Cæsarean section for craniotomy on the living fœtus, we, with our few cases and awful death-rate, are certainly not in a position to consider seriously such a remarkable change. For the present, such a project is Utopian—if you deem the word too harsh, absurd.

When we oppose Cæsarean section to craniotomy, as remarked by Leopold, we must consider also the fate of the women and children after the operation. Passing over the high mortality of children delivered by Cæsarean section, attend for a moment to the later condition of the mother. The ideally perfect Cæsarean section demands that the woman be left in such a state as to permit the continuance of the functions of menstruation, conception, and pregnancy. The returns from the operation, as to this point, are not in. This is an item that has hitherto escaped critical scrutiny. Dr. Kelly says that in one of his cases a utero-abdominal fistula remains. The same consequence has been observed in other cases. Apart from the effect upon the functions of the uterus, this untoward result is of great moment to the subject of the operation, inasmuch as it limits her usefulness. As before intimated, osseous anomalies of the pelvis occur, as a rule, among the poorer classes, in women who have to do manual labor for a living.

A word as to the upper limit of the absolutely contracted pelvis. The form of osseous anomaly of the pelvis, by far the most frequent in occurrence, is the simple, flat, rachitic type. The upper limit at which Cæsarean section is allowable, in flattened pelves, not compensated by a long transverse diameter,

Dr. Lusk fixes at two and one-half inches in the conjugate. I think a lower limit, six centimetres, is a better boundary line. French observers place the limit still lower. In this class of pelves too much attention has been paid to the biparietal, and too little to the bitemporal diameter of the fœtal head. In vertex presentations in flattened pelves, the sinciput is on the same plane with, or even lower than, the occiput, and it is the bitemporal diameter, not the biparietal, of the fœtal head that is commonly required to pass between the promontory and symphysis. At least, it is the aim of the accoucheur to effect this adjustment. This end, of course, is more easily attained on the after-coming than on the presenting head.

With reference to the time of operation, Schrœder's advice deserves consideration. Operate early, in the very beginning of labor, before infection or exhaustion of the patient. Frequently the operator can so elect his time as to be aided by daylight and fit assistants.

As to the *technique* of the operation, the use of digital compression of the lower uterine segment, instead of the elastic ligature, merits attention. This item has been repeatedly pointed out by Doléris, Sänger, and others.

It is probably better to oppose the cut edges of the uterine serosa, as suggested by Schrœder, J. Veit, and others, than to attempt the approximation of broad areas of the peritoneum, as originally recommended by Sänger.

Dr. Lusk.—I am not quite clear in regard to Dr. Engelmann's question. My statistics seem to show that up to the present time, in spite of the improvement in the Cæsarean section, the results of craniotomy are nearly perfect, and if we want to bring the two operations into direct comparison, one with the other, it is necessary for our operators in this country to be a little more careful about details, than in times past. Even with the utmost care, as we saw in the case reported by Dr. Polk, there is a strong margin in favor of craniotomy which only justifies us in resorting to the Cæsarean section in cases in which it gives the woman the best chances of life, or in which we have her consent, or at her own expressed desire for the sake of giving her a living child.

ANTEFLEXION OF THE UTERUS; ITS ETIOLOGY, VARIETIES, PATHOLOGY, DIAGNOSIS, PROGNOSIS, AND TREATMENT.

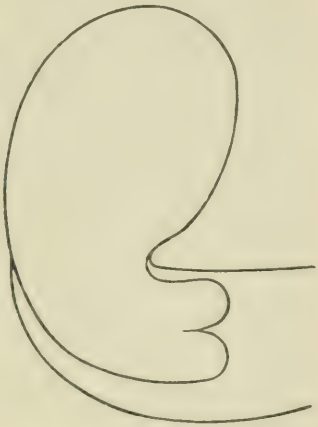
By T. Gaillard Thomas, M.D.,
New York.

So much has been written upon the condition which is announced as the subject of this essay, that I doubt not that surprise may be felt at my selection of a topic so trite and threadbare. Three motives have actuated me in its choice; first, in gynecology at the present time there seems to be a tendency to study too exclusively those subjects which are entirely new; second, I am impressed with the belief that I may be able to shed some little new light upon an ancient theme; and third, while admitting that much, very much has been done for the elucidation of this one, I feel assured that much more remains to be accomplished before the treatment of anteflexion becomes either easy or satisfactory. In the beginning let me announce that I propose to offer you no formal thesis, or conventional essay. I start out with the conclusion that what has thus far been said upon my subject is as well known to every man here as it is to me. My desire is to tell you merely what my personal convictions are since I last declared them, based upon fuller experience, more attentive observation, and more sincere and careful experimentation. To this end I shall avoid quotation of authors and citation of the views of others; I shall not combat the opinions of other observers, however much I respect them; and I shall in many points flatly contradict my own reiterated statements and theories of the past.

VARIETIES.—It seems to me that no man can form correct views of treatment of anteflexion of the uterus who is not willing to start out with the recognition of the following varieties: 1st, anteflexion of the body of the organ while the cervix

FIG. 1.

FIG. 2.



remains in normal position, corporeal anteflexion; Fig. 1: 2d, anteflexion of the cervix while the body remains in normal

FIG. 3.

position, cervical anteflexion; Fig. 2: 3d, simultaneous anteflexion of both body and cervix, corporeo-cervical anteflexion;

Fig. 3: 4th, irreducible anteflexion, that in which an absolute deformity of the organ exists, which cannot be overcome by ordinary means; and 5th, reducible anteflexion, in which by the use of the finger and uterine sound reduction may be readily accomplished.

I said just now that without the admission and recognition of these varieties no one can attain to success in the treatment of this disorder, and such is my conviction. A sharp bend of the uterine neck requires an entirely different plan of treatment from a similar bend in the body; the two conditions are unlike in every respect, and a plan which would entirely relieve one would be wholly inappropriate to the other. So the treatment of a deformed uterus, which, like a gourd-shaped pear, has, day by day and year by year, *pari passu* with the growth of a growing girl, slowly acquired its deformed shape, requires a plan of treatment which would be uncalled for and utterly inappropriate to an accidental fall of the uterine body, which has existed only for a few months, can be readily replaced by the finger, and with equal readiness sustained by a vaginal pessary.

I am aware that objection will be raised to this nomenclature. I admit that it is imperfect; but the application of the term, "congenital," to the former of these varieties is clearly improper, for the deformity does not exist at birth, but is a faulty development acquired as the uterus grows to a condition fit for the performance of the functions of womanhood. However imperfect and objectionable it may be, it is certainly preferable to treating all the varieties which I have cited—cervical and corporeal, reducible and irreducible—under the same head, confounding alike the pathology and the requisite treatment under one and the same plan, without distinction as to whether a sudden effort has caused the flexure or whether it is the result of years of imperfect development.

Etiology.—The deformed uterus to which I give the name of irreducible anteflexion, is created usually in this way: as the insignificant, infantile uterus begins to develop about the

tenth year, preparatory to the functions of puberty, if the girl by tight lacing or wearing of heavy skirts, systematically forces the abdominal viscera down upon the growing organ, and presses it down into the pelvis, that slight anterior curve which is natural to it is mechanically increased, the body is flexed, and corporeal flexion results. If the body be not thus interfered with, but the rectum be habitually kept distended by masses of fecal matter, allowed to remain in this viscus for a week at a time without evacuation, the neck is sharply pushed forward and cervical flexion results. If both these mechanical influences be at the same time active, both body and neck are flexed forward, a "horse-shoe uterus" is created, which is synonymous with the corporeo-cervical flexion of my nomenclature.

These abnormal changes are not created by mechanical influences alone. The flexion of either body or neck will often damage the nutrition of the uterus; one part will grow out of proportion to the other, and thus the creation of one or other variety is furthered by derangement in physiological development.

I do not wish to be understood as maintaining that all the numerous instances of irreducible anteflexion which are met with so frequently are necessarily created by these two agencies, and by these alone. I merely maintain that these factors are more frequently active than any others. I likewise admit that Mr. Grailey Hewitt's assumption that impoverished blood and malnutrition are potent predisposing causes is perfectly correct.

The production of reducible anteflexion, that occurring after full development of the uterus, and which is due to some suddenly acting cause, may be due to any influence suddenly or gradually pushing the uterine body down from above, as muscular efforts, abdominal tumors, or uterine growths above the os internum; second, to any influence weakening the power of the uterine parenchyma, as cervical endometritis, impaired nutrition from general disease or lack of food; and third,

from any influence exerting direct traction upon the uterine body, as false membranes the consequence of peritonitis. Any one of these, acting either by sudden or by gradual agency, may produce the result.

Pathology.—Before puberty and after the menopause, the uterus is so insignificant an organ in the economy that a flexion of it, even of an aggravated character, very commonly passes unnoticed, and even when discovered requires no treatment. But during the time of menstrual activity, that is to say, between fourteen and fifty, a decided anteflexion is always a matter of grave significance. The idea which is even now so often maintained that anteflexion is to a great degree a normal condition, is answerable for very little constitutional disturbance, and should, as a rule, be ignored, is a pernicious error, usually having for its basis either want of experience or a desire to avoid an issue for which the speaker feels his resources to be inadequate.

I admit that in a certain number of instances I advise against treatment in such cases, but never for such reasons. I advise against it on account of the great, almost insurmountable, difficulties attendant upon it; on account of peculiarities of certain women, which render them inapt for bearing severe treatment; or on account of the fear of exciting pelvic peritonitis in subjects who have already suffered from it.

I admit still further, that if I should ascertain that a young woman had an anteflexed uterus, and suffered no evil symptoms traceable to it, I should feel very loath to urge treatment for the condition. But such cases of immunity from resulting symptoms are so rare as to require little consideration. As a rule, given a decidedly anteflexed uterus in a menstrual woman, and the result will be an invalid requiring the assistance of art. She will suffer from some of these symptoms: nervous disorders, ovarian disturbances, derangements of menstruation, sterility, or tendency to abortion, excessive gastric trouble during utero-gestation, marked tendency to vesical irritation, and troubles of vision.

Diagnosis.—Were I reading this paper to an audience composed of younger men, I should say a good deal upon the subject of diagnosis. To the present assemblage I have merely to direct attention to the fact that a flexion of the body will sometimes occur so very high up as to elude the vigilance of one who expects always to find the deviation at the os internum uteri. Such flexions at the middle of the body are very rare, but they do unquestionably occur.

Prognosis.—If asked what, after a very large experience in the treatment of this disorder—an experience of over thirty years—is my opinion as to the prognosis which a conscientious practitioner is warranted in making, I should be forced to reply with a great deal of caution. The field is a most discouraging one; the instances of utter failure which are met with in it are many; the responsibilities surrounding it are great; and yet I should say that so many cases are relieved, so many entirely cured, that the gynecologist who neglects to put the resources of his art at the disposal of women thus suffering, is culpable, and reflects discredit upon his calling. A great many of these cases, more especially of those of the reducible variety, are susceptible of palliation, and a smaller number of cure. While I admit that the field is beset by discouragements, I feel sure that failure more often depends upon inefficient therapeutic resources on the part of the practitioner, than upon the difficulties inherent to the pathological condition itself. And I would add that I feel convinced that a habit of treating these cases without regard to their varieties, and without studying out carefully the peculiarities belonging to each individual case, is to a great extent answerable for the non-success which has attended the efforts made for their relief.

But the chief source of discouragement which attends these cases is the great tendency to relapse which marks them. No one who reflects upon the unnatural condition of the parenchyma at the point of bending in a uterine flexion, can feel any surprise at the frequency with which relapses occur, even

after the deformed organ has been kept in position for many months. A prolonged flexion produces atrophy in the wall which is bent and consequently it is disturbed as to circulation, innervation, and nutrition. In some cases even fatty degeneration is found to exist at the point of flexure, and tissue change is so decided there that nothing short of atony could be expected.

There are uterine ligaments and juxtaposed organs which prevent uterine versions. There is none which prevents uterine flexions. In this regard the uterus must depend upon the inherent power of its own parenchyma. Flexion annihilates this power, and even after years of complete reposition and retention relapses will occur. Unfortunately our means for repairing tissue change here are, as they are everywhere else in the economy, deplorably deficient.

Treatment.—In dealing with the subject of treatment I desire to be as short and as succinct as possible, avoiding all doubtful and theoretical suggestions, and limiting my advice strictly to what I know from the evidences of my daily practice, the experience of my daily life, to be able to bear the test of trial.

That the views which I shall advocate are not generally accepted in the profession is fully evidenced to me by the histories of cases which come to me for treatment. Over and over again such histories as these are given by women suffering from marked anteflexion and the usual results of this condition. "I consulted," says one, "Dr. A., who recognized the uterine deformity of which you tell me, declared that it was not an important factor in my case, said that hundreds of women who had it were quite well, and treated me with internal remedies and general hygienic means for two years without benefit." Another says, "I was treated by local applications, hot vaginal douches, and rest for eighteen months by Dr. B., and left him at the end of that time no better than when I went to him." A third declares that Dr. C. zealously but hopelessly inserted vaginal pessaries,

and medicated cotton tampons, and resorted to electricity and change of air and scene for similar periods. Far be it from me to impugn the motives of Dr. A., B., or C. Each one acted according to his lights, and in sympathy with the faith that was in him. I construct no code of morals for my neighbors, but I do unhesitatingly and boldly declare my conviction that Drs. A., B., and C. were entirely astray in their plans of treatment; that were I, standing where I do in belief, to follow their examples I should not be acting conscientiously; and that, as far as cure of such cases (I admit the possibility of palliation) is concerned, I would rely with fully as much confidence upon the doctrines of the "Faith Cure" as upon their methods.

As soon as a diagnosis of anteflexion is made in a patient entrusting her interests to me, I decide promptly upon these points: First, Should the case be treated at all with the view of cure? Second, Is it so far a recent and reducible displacement that I can hold out reasonable hopes of decided benefit by the use of the uterine sound and vaginal pessaries, or is it one which will require more radical and more hazardous means? Third, If it belong to the latter class, are the patient and her friends willing to accept the arbitrament of operation with its dangers, and its manifold chances of failure as to its complete and perfect success?

Let us suppose that the case is one of the worst which we meet with, a case of absolute uterine deformity, and that I deem interference advisable. I state the truth plainly and unreservedly as to the dangers and chances of failure; at the same time often adding, "were the patient a member of my own household, I would not hesitate about resorting to surgery for a cure." If the patient and her friends agree, I proceed as I shall come very soon to tell you; if they do not, I say that no other plan of cure is known to me, and that I advise them to go elsewhere for treatment. During the course of every year I send many cases away with this statement, made

in the same spirit that a general surgeon would make a similar one to a man suffering from dislocation of the humerus.

It is always painful to expose a woman in perfect health to an operation attended by any danger. A prolonged illness or a death occurring after a presumably trivial operation is always more harrowing to a surgeon than one following a capital operation. In the one case the dangers are appreciated and the family prepared for them; in the other the fatal issue comes "like a clap of thunder from a clear sky." In the one case, in the minds of friends, the surgeon has done all that he could in a terrible issue; in the other, the patient is cut untimely off, and has "slipped through the doctor's fingers." One death occurred to an invalid who had before her the prospect of an invalid's life; the other has cut off a woman in the prime of her life and the pride of her womanhood.

There is not a man here who has not in sorrow and in bitterness felt the truth of this statement; and there is not a man here who does not agree in the wisdom of fully preparing the relatives of patients for the issue which may overcloud this department of surgery when applied to apparently trivial cases. The gynecological surgeon works always like one who works over the crater of a volcano; the sensitive peritoneum, resembling as it does, an expanded lymphatic gland, is always near at hand to stamp his most trivial work with disaster, and to defeat his best efforts with death.

Having determined that a given case is one appropriate for treatment, I proceed to test the question as to the organ's being reducible or irreducible, by attempting replacement by the finger and uterine sound. If replacement be practicable and easy, I rely for local treatment upon complete retroflexion by the sound, retention in this posterior malposition for about thirty seconds, at intervals of two or three days, and support by a vaginal pessary. In such a case, be it understood, the flexion is always corporeal, never cervical as it frequently is in the irreducible variety of anteflexion.

I have neither the disposition nor intention of fighting over

again the old issue as to the utility or inutility of pessaries. The older I grow in years, and I trust the more mature in experience, though I freely admit that the latter proposition is by no means a corollary of the former, the more certain do I feel that the man who assumes the position that pessaries should be cast aside is not fit to practise gynecology; and the more willing am I to admit that he who uses them indiscriminately and incautiously should be shunned as a dangerous practitioner.

I strongly suspect, however, that gynecologists may be with justice divided into two classes: those who know how to use pessaries, and those who do not. The former class get good results from them, and in proportion laud them; the latter get bad results and therefore decry them. The shortcoming is in the doctor, not in the instrument. As this is true of retroflexion pessaries, so is it of those used for anteflexion. Careful study will give facility in their use, not previously dreamed of in the philosophy of the sceptical doctor. At present, I usually employ a Grailey Hewitt pessary; one of my own, which I here exhibit; or my modification of Cutter's pessary, which is here shown. In some cases, one of these will be found applicable; in some cases another. In some difficult cases, the modified Cutter will be found to give greatest satisfaction and to be even essential to success.

It is a decidedly exceptional occurrence to find a reducible anteflexion which cannot be treated by the local means mentioned. But some exist in which the last of the instruments alluded to becomes necessary at least for two or three months, before one of the two former ones can be used with effect.

If pessaries of the varieties mentioned fail, I then resort to the glass intra-uterine stem, employed as I shall very soon indicate.

So soon as the uterine flexion is overcome, I endeavor to strengthen the enfeebled parenchyma so as to obtain support from it, after artificial support is withdrawn, in the hope of

preventing that relapse which is to be so much dreaded in all these cases.

There are but three plans for accomplishing this much-desired result upon which I at all rely, and I am by no means sanguine as to the efficacy of these. First, I put my patients upon full diet of animal food, milk, malt, wheat, malt-liquors, and wine; second, I give Fellows's syrup of the hypophosphites systematically, not from its superiority to other preparations, but because of the strychnia which it contains in combination; and third, I pass the galvanic or electric current through the uterus twice a week, one electrode being placed against the anterior wall of the cervix in vaginam, and the other over the hypogastrium.

Usually after six months' use of these local and general means, I remove the pessary and see how far I have succeeded in effecting a cure.

Should the flexion be an irreducible one, and of corporeal or cervico-corporeal variety, I do not rely upon the methods just mentioned. They are inefficient and unreliable. In such cases greater energy is called for, and I prepare for the issue, as I have said, by explaining the difficulties, dangers, and uncertainties of the case to the patient's friends. Then anæsthetizing her, I rapidly introduce graduated dilators through the cervical canal until Ellinger's dilator will pass through the os internum uteri, and by this I fully stretch the whole canal of the cervix, especially the os internum uteri. After this I introduce one of the glass stems, which I here show, after the following method. The patient lying in the Sims's position, and the posterior vaginal wall and perineum being held up by the speculum, the cervix is steadied by the tenaculum, and by the fingers the stem is put in place and pushed home. Then, over the base of the stem, Hunter's depressor is pressed, the uterus is pushed upward and forward by it, and the sustaining pessary, which I now show, is slid down upon the depressor and at once assumes its position. By this systematized plan the adjustment of both stem and

pessary is easy; by any other method that I know of, it is not only difficult, but often impossible.

The patient is then put to bed, and kept there until the next menstrual period has passed, with the stem *in situ*. It matters not how long a time may elapse between the operation and the advent of the period.

Fig. 4.

My faith is so strong in the belief that glass is safer as an intra-uterine stem than any other substance, that nothing would induce me to employ anything else. Silver, gold, and platinum would all answer, but it is so much harder to be sure of their cleanliness that I would not consider their claims.

Should pain occur at any time, which becomes severe, the patient is instructed how to remove the stem by simply pulling out the supporting vaginal pessary in such a manner as to throw its upper extremity upward, engage the base of the glass stem in its cross-bar, and thus remove stem and pessary together.

Divulsion and the introduction of an intra-uterine stem should be practised with antiseptic precautions as minute and strict as to details as those used for laparotomy. Thus practised, the dangers attending it are small; otherwise employed,

the dangers are so great as to become prohibitory. The patient being anæsthetized I wash out the vagina freely with a hot solution of bichloride of mercury, one to two thousand, leaving a large surplus of this fluid in the vagina. The cervix is then held immersed in this accumulation by the tenaculum, and kept thus immersed so that the os uteri is covered by the antiseptic fluid all through the various steps of the operation. To one who has never tried to do this it may appear that it would be difficult; it is, in fact, very easy. After the operation I have the vagina douched once in every eight hours with a warm two and a half per cent. solution of carbolic acid, and this is kept up until the next menstrual epoch has appeared.

During this time the patient is never allowed to rise from bed for any purpose whatsoever, and the temperature is regularly taken night and morning. Should it go up to 102°, the pessary and stem are at once removed and the vaginal douche still more persistently used. If it rise to 104°, the patient is put into Sims's position upon a table, and by means of Nott's or Byrne's intra-uterine catheter the whole uterine cavity is thoroughly douched with a hot solution of the bichloride once every eight hours until the bad symptoms have subsided.

After the passage of the menstrual epoch, the patient is allowed to leave her bed and gradually to resume her usual avocations. I have treated many hundreds of cases of anteflexion in this way and have never had a fatal issue occur. But many times I have been greatly alarmed by high temperature marking the threat of septicæmia, and twice have pelvic abscesses developed.

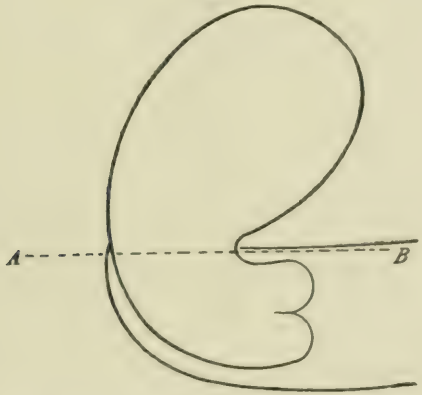
The procedure just described is a dangerous but perfectly warrantable one. He who is not willing to practise it under thorough antiseptic precautions should never tamper with it, it matters not whether his neglect of antiseptic means be due to scepticism, to recklessness, or to indolence.

By this means great relief will very often, and complete cure sometimes, be effected in irreducible corporeal or cervico-corporeal anteflexion. But where a true cervical flexion exists

it never, so far as my observation goes, accomplishes much good. This form of displacement or deformity is generally due to the combination of two conditions: first, the pushing forward of the undeveloped uterine neck in the young, growing girl; and second, imperfect development from disturbed nutrition, a true partial arrest of development in this part below the os internum uteri.

If this cervical flexion be very limited in extent, the operation of posterior section followed by the use of the stem for three or four months may effect a cure. As I have before said, that operation should not be abandoned because it was formerly abused. Its abandonment now would be as bad as its abuse was a few years ago.

FIG. 5.



But in many cases posterior section is not sufficient. For these there is but one resource, amputation of the neck, at the dotted line *a b* in Fig. 5, and closure of the stump by bringing the mucous membrane together after Sims's plan. Then the stem should be kept in utero for at least three months, when healing of the wound will be complete and tendency to contraction will have passed away.

It will be said that removal of the cervix may destroy the uterine balance and give a tendency to displacement of the

body. I admit this; but at the same time I must say that I have not had trouble from that source, and even were it to occur, the condition of the patient with an anteverted uterus and a straight uterine canal would be far better than that of an anteflexion such as Fig. 2 portrays. I concede that this operation does not secure perfection; but I claim that it does afford great palliation of a former very bad condition.

The operation is a very simple one, and unattended by dangers greater than those attending the use of the divulsor and stem. My experience with it is not as yet very large, but so far I am very favorably impressed by it, and do not hesitate to urge its adoption. Fortunately, the point of bending in a case of true cervical flexion is almost invariably low down, below the vaginal junction with the uterus; a fact which renders amputation a much more promising procedure than it would be if the flexure occurred higher up.

Let me here anticipate a question which I feel sure will be asked in the discussion of this paper: how often I have known conception to occur after these various procedures? I cannot answer this categorically. Most of my patients have lived at a distance, and many of them have been treated in the Woman's Hospital Once at home, all communication with them has ceased, and they have been to a great extent lost sight of. Then, too, I am not a methodical man, and have not kept notes even of reported cases. All that I can do in an honest effort to answer the question is to give my general impressions, and let them go for what they are worth. After the treatment of reducible anteflexion by the sound and vaginal pessary, and by the uterine stem, I have frequently—I may say very often—seen sterility cured. After treatment of irreducible cases by the divulsor and stem, I have rarely, though sometimes, seen it cured. And after amputation of the cervix for pure cervical anteflexion, I have known of but one case in my experience with the method.

In closing this essay, would that I could color its conclusion with the roseate hue of brilliant hope for wonderful and almost

never-failing success, which gives such fascination to many essays of its kind. Alas, I cannot do so. Putting into practice all that I have advised, I often fail in curing that obstinate malady, *anteflexio uteri;* in many cases I fail even in effecting palliation. But while I often fail, I much oftener succeed in accomplishing good; even when I fail, I have the satisfaction of feeling that I have done so in spite of the adoption of the only course which appears to me to be dictated in these trying cases by honesty and common sense; and my chagrin is soothed by the certain knowledge that I have not put my patients to great expense and trouble for long periods of time, while experimenting with plans which, it seems to me, can hold out hope only to the superficial thinker or the enthusiast.

DISCUSSION.

Dr. Thomas.—Mr. Chairman, I am more than delighted that I am able to read my paper before this Society in the presence of a man who has done more to further the subject of anteflexion of the uterus than any other man—Dr. Grailey Hewitt, of London.

The Chair then called upon Dr. Hewitt to open the discussion.

Dr. Grailey Hewitt, of London.—It gives me great pleasure, Mr. President, to be called upon to say a few words in reference to the very important subject which has been brought before us by my friend Dr. Thomas. My earliest recollection goes back many years. I recollect some years ago seeing abstracts of papers written by him, and I was struck by his name at an earlier period of his career; the spelling of his Christian name attracted my attention, and since that time I have had numberless opportunities of making a further acquaintance with his writings and works.

In regard to this paper, I feel that Dr. Thomas has really so completely taken the wind out of my sails that there is very little for me to say. There is very little in which I should be

able to express a difference of opinion from that which Dr. Thomas has said, and he has gone over the ground so thoroughly that if I were to follow him I should have to occupy almost as much time in the discussion as he took in the reading of it.

I would beg to say, however, that I think it is exceedingly important we should have a due estimation of the manner in which anteflexion is produced, and we should appreciate the fact that it arises slowly as a rule, and gradually; that it becomes more and more intensified in the process of months, but more frequently years; and that it occurs, as a rule, in consequence of the fact that the tissues of the uterus have lost, to a greater or less degree, their resisting power; they have lost the hardness and resistance which they naturally possess in the case of a healthy woman, and in the course of time the result is the production of a deformity, beginning as Dr. Thomas has beautifully shown in the drawings there.

I think we must classify the cases very much in the way Dr. Thomas has classified them; I think that is as good as any with which I am acquainted. I will pass to say a few words respecting some other points in the paper.

There is a difference in the degree of flexion in different cases, which is a matter of great importance; these must all, of course, be taken in connection with the different degree of softness of the uterus; that is to say, you must avoid error in this respect, for the uterus must be very hard if it is very much anteflexed.

After it has been anteflexed for some years it loses its softness, and you may come upon cases in which the uterus is very hard; it is hardened in its sin, in fact, and it is very difficult to produce a cure, as Dr. Thomas fully appreciated in the remarks he made.

With reference to the question raised as to whether anteflexion of the uterus is a feature or not in the production of suffering, it is very strange that in these days we should be called upon to take this question into consideration at all, and I fully agree with Dr. Thomas in what he says as to this error, which is prevalent in certain quarters, being a most pernicious one, and one which is calculated to retard the knowledge of uterine disorders more than anything of late years. However, there is no doubt that things will take a turn after a time; on this side of the Atlantic there has never been that tendency to disregard

this condition that there has been more particularly of late years in Great Britain.

His remarks on diagnosis are exceedingly valuable, but so long as there are many practitioners who are not at all accustomed to making physical examinations under any circumstances, how can it be expected that a diagnosis can be arrived at, or that any proper knowledge on the subject of anteflexion can exist?

Now, there are certain conditions which are of the utmost importance to the welfare of women; one is the liability to sterility which exists in cases of chronic anteflexion. This matter has attracted comparatively little attention, even among writers on the subject. There is no doubt that, even supposing that anteflexion is not so bad as to give rise to severe symptoms, there are many cases in which it produces sterility and interferes with conception.

And so again, with reference to the frequency of abortions; the liability to these is likely to be very great, brought about by flexion, including anteflexion. Only in the course of the last few months I had a case in which the patient had had four or five abortions and one premature labor, the uterus in this case being very acutely anteflexed. I treated her for a little while, but she aborted quickly, and when she became pregnant the second time, under my observation, the same thing happened. I then came to the conclusion that it was necessary to dilate the uterus as a part of the treatment in order to get rid of certain contractions which I suspected existed in the uterine canal near the os. The case was brought to a favorable issue by continuing the treatment of the patient during pregnancy, by looking out for difficulties, and by meeting them as they arose; but the phenomena observed in that case were enough to show that the anteflexion was the difficulty, and when that was reduced the case was capable of being cured. Now there is another great symptom, that is sickness. I will not speak on that point now, because I shall have the honor of reading a paper on the sickness of pregnancy to your Society to-morrow.

With reference to pessaries and the treatment of anteflexion with pessaries, Dr. Thomas has complimented me by saying that he is in the habit of using a pessary applied by me some years

ago, or at least a modification of it. What he said seems to me to be everything that could be desired and to embody the truth.

In reference to another point in the paper—that is, to the case of amputation of the cervix, which he employs in a certain number of cases which are otherwise incurable. These cases are undoubtedly very difficult to cure. I have overcome the difficulty in a few instances by drawing the os uteri backward, cutting out a piece of the mucous membrane of the vagina and then stitching the edges of that and keeping them together so as to draw the os uteri backward, and thus undo a portion at least of the flexion of the cervix; and that has been successful in regard to sterility in the cases in which I employed it, and I think that is preferable to taking away any portion of the uterus.

The administration of food and nutritive remedies is a matter of the utmost importance, and so far as stems are concerned the glass is safer to use than any other.

I will not detain the Society any longer at present, and have to thank them very much for their attention.

Dr. W. O. Priestley, of London.—I cannot let the very fine paper of Dr. Thomas pass without a few words. This question has been so vexed a one that we shall all be glad to have any new light thrown upon the subject, or any sort of confirmation of opinions previously expressed, either in reference to the frequency, or to the treatment of cases of this affection.

It is not long ago that Churchhill told me that he had never seen a case of anteflexion or retroflexion of the uterus, and now we have one that says that uterine displacements are the cause of every gynecological affection that women suffer from, even hysteria, to which so many young women are liable.

I wish Dr. Thomas, or someone, would give us statistics of this class of cases, because it is statistics we so much need. We have as yet, so far as I know, notwithstanding Dr. Hewitt, no trustworthy statistics in reference to the frequency of symptoms as compared with the frequency of the displacement of the organ itself. And not only this, but we want statistics as to how far the treatment is successful, and as to the value of treatment, and the best that can be devised in these various cases. I am sure our members will regret very much, as I do, that the treatment of uterine displacements, as he has said, has had undue importance.

The influence of Dr. Hewitt's teachings have been to raise up a school of gynecologists who favor bringing a young girl not more than fifteen or sixteen years of age under active treatment. I do not suppose that anybody would be disposed to submit her to any of the more severe methods of treatment that Dr. Thomas has detailed, but it becomes an entirely different question when a married woman is suffering from sterility with symptoms prominent in the pelvis of a distinct anteflexion or anteversion calling for treatment. There are many cases in which, though there are no active symptoms, there is, at any rate, that passive symptom, sterility, for which she applies to be cured, and possibly when this form of displacement is present, and no other pathological condition is present, it then calls for treatment. We want statistics showing the effects of mere displacement of the uterus without any other pathological condition complicating it, and giving rise to anteflexion.

Dr. West holds, however, that mere displacement of the uterus never does give rise to any active symptoms, and this question has never been properly decided by statistics, and I do not think we are in a position to determine what is the actual value of treatment. Still there are a great number of cases which can be treated successfully, and I, for one, am only too much obliged to Dr. Thomas for teaching us how many of them can be treated with safety. Now, whoever can teach us in these cases of displacement, so to meet the circumstances that we can make our diagnosis, can also teach us how to treat them with impunity when treatment is called for, thus not only conferring a great favor upon our patients, but also upon the profession.

Dr. Eli Van de Warker, of Syracuse, New York.—I rise to add an historical addition to the paper of Dr. Thomas. I read a paper some ten years ago on anteflexion of the uterus, before this Society, at which time I was strongly condemned by Dr. Thomas and others for advising the use of the intra-uterine stem. It certainly is a great pleasure to know that Dr. Thomas has reversed the verdict he gave upon my paper and now endorses some of the views which I enunciated then. I believe that if, at that time, I had treated a patient by the intra-uterine stem and the patient had died, there was no gynecological authority to call upon to save me from a charge of manslaughter. I have

now used that method for twenty years, constantly treating cases of flexion by the intra-uterine stem. I follow out as carefully as Dr. Thomas has indicated in his paper thorough antiseptic precautions, but I began that work before he thought of that sort of thing, and I never yet saw a case of damage to health or danger to life following its use or due to sepsis. I will not go into the method, or the form of stem I employ—that is a minor consideration; but I am utterly amazed to hear it stated that anteflexion of the uterus is unattended by symptoms. I never yet saw a case that did not have original symptoms attending it, but those symptoms are of great variety, and oftentimes contradictory in character. In some cases, with active menstruation, there will be dysmenorrhœa, and from general impairment of the health that will diminish, and the patient will have less pain because she is menstruating less in amount, and hence she has a certain immunity from one group of symptoms. In other cases a young woman will go on with anteflexion of the cervix or flexion of the uterine body on the cervix with apparent health up to the time of marriage, and after that event she will begin to develop symptoms, while previously there was nothing more perhaps than a slight dysmenorrhœa which did not call for any treatment, but after the complete functionary life of the organ begins then we have symptoms of the flexion. Another fact in regard to the character of the symptoms of the flexion is that they largely involve the nervous system. I think nobody will speak slightingly of hysteria following those cases; hysteria in some form invariably attends it. I never yet saw a case of flexion that was not attended by symptoms, and it seems to me an instance of oblique observation for one to say that there are no symptoms of flexion. I have written that we did not know what anteflexion of the uterus was, and that a man who said it was not attended by symptoms was talking about another form of displacement entirely, because his observation of a fact could not be so totally different from that of all others, if we understood alike what is meant by the term.

I believe I have had exceptional opportunities to learn something concerning the symptoms that attend uterine flexions. Those who adhere to the inflammatory theory assign to that pathological condition the origin of all the subjective pelvic

signs that I believe are due to the uterine distortion. I do not make any attempt to treat associated pelvic conditions; but after assuring myself that there are no adhesions, indurations, or phlegmons, I at once introduce the stem, making the operation as antiseptic as possible. The result is that dysmenorrhœa disappears; ovarialgia and sacralgia diminish, nervous reflexes disappear, and the nutrition of the patient becomes restored. I can account for this only on the theory that the disability of the patient was the outcome of the uterine distortion, and its resulting reflex upon the nutrition and innervation. I have had these results follow in cases that had been under the care of competent physicians, who had treated them under the theory of inflammation without results. To a certain extent it is self-evident that if we straighten a flexed uterus and relieve the nerves from pressure at the seat of flexion, and restore the circulation in an engorged fundus, we are doing something to relieve symptoms that are due to this condition.

Dr. B. Emmet, of New York.—There are cases of young girls who have slight dysmenorrhœa; after marriage it is liable to become worse, and then, of course, those cases have to be treated for dysmenorrhœa.

My explanation is this: that the sexual congestion added to the natural congestion causes such a thickening in that bent cervical canal that after marriage they have greater difficulty than before, and then is the time to interfere.

Dr. H. P. C. Wilson, of Baltimore.—Anteflexion of the uterus never has a congenital origin, and in the second place it very rarely, if ever, occurs suddenly. I do not think it can occur from a fall, or a blow, or an injury; it is a disease that occurs progressively, and the cases of anteflexion we are called upon to consider are almost always in young women.

Of the causes of anteflexion the most prolific is constipation. Ninety nine out of one hundred young women from twelve to twenty-five are constipated, and it is a common thing for me to find, upon questioning them, that they have gone one week without movement of the bowels, and very frequently they go three or four days without an operation. When the uterus begins to spring into life at the age of twelve or fifteen years, if the rectum is heavily clogged with indurated feces the uterus must

grow crooked, and if stays are brought to bear upon the lower abdomen in addition to the constipation, that, of course, increases the difficulty.

Another great cause of anteflexion of the uterus is the system of education in young girls. In our country, young girls are expected to be educated up to the standard of men, and to acquire their education and be ready to go into society at the age of eighteen years, whereas a man does not accomplish the same until he is from twenty-one to twenty-five. If, at the age of twelve or fourteen an ambitious girl is overworked at school, her nervous power is exhausted through the brain, and she has no nerve supply to give to the uterus at the time when it is springing into active life. We all know that it grows from a rudimentary mass, within a very short time, to its healthy normal condition, and if the girl has not the proper innervation to give to the organ at that time, it grows weak and sickly, and it then takes very little to give it a tilt forward in an anteflexed position.

In regard to the treatment, I agree with Dr. Thomas, that any man who ostracises the pessary had better stop practising gynecology; but I have yet to find any benefit from the use of pessaries in anteflexion. I have tried Hodges', Thomas's, and Grailey Hewitt's—every form that I have ever seen—and I have never gotten any benefit from them. It is with the uterus grown crooked, just as with the crooked limb of a tree. You may straighten the body or the neck, and as long as you bring the force to bear, it is straight, but no longer. If you raise the fundus, and carry it backward, you carry the cervix that much forward; if you put a pessary under the fundus and raise and shove it back to the rectum, you carry the cervix forward and upward, but there is no change in the flexion. In anteversion it is a different thing.

Gentlemen of this Society are aware that I read a paper at the last meeting of this Society, in Baltimore, on division of the cervix for anteflexion of the uterus. I use this remedy for anteflexion, because in ninety-nine cases out of every hundred there is induration or stenosis at the internal os, and the circulation and innervation of the womb are involved. My treatment of anteflexion is Sims's old operation, which I do now more than ever.

I have done it more than 400 times. I divide the cervix up to and through the internal os backward, and then reverse the knife and split the internal os forward. I let my patient alone until cicatrization takes place. I then use a dilator to keep the canal clear and prevent contraction; and in time the uterus straightens itself, if we keep the bowels free and attend to the general health. I have failed with all other means in treating anteflexions. If you have twenty women with anteflexion, nineteen out of that twenty will be sterile.

If a young married woman comes to me and I can see no reason why she has not conceived after a number of years, she is almost certain to have dysmenorrhœa and all sorts of reflected nervous symptoms, and in ninety-nine out of every hundred I have found the uterus to be anteflexed, with dysmenorrhœa and stenosis at the internal os. Where I have operated upon women within three or four years after marriage, who were sterile, as near as I can approximate my statistics, I think about seventy-five per cent. have conceived. A remarkable case was that of a woman who had been married fourteen years, with terrific dysmenorrhœa, being sick in bed for several days in every week with sick headache. I divided the cervix, kept the canal open, and treated the cavity of the uterus, the mucous membrane of which, through long dysmenorrhœa, had degenerated and become diseased. That woman conceived after fifteen years of sterility and has now a healthy living child.

Dr. Goodell, of Philadelphia.—I have had a large experience in anteflexion, and I must say that I still believe in the views I have expressed many times, that anteflexion *per se* is not a pathological condition, and that it has no symptoms whatever apart from those produced by stenosis and sterility when they are present, but they are by no means always present. When a woman has anteflexion, she may have those nervous symptoms which have been alluded to, not because she has anteflexion, but because the flexion has produced a dysmenorrhœa, and the nervous symptoms result from the pain and from the pathological changes which may have taken place in the womb, in consequence of the powerful efforts to expel through a too narrow canal the menstrual fluid. Apart from these secondary causes,

I say that the cases are exceedingly rare in which anteflexion produces any constitutional symptoms whatever.

I agree with Dr. Thomas fully in reference to the treatment, viz.: forcible dilatation and the occasional use of the stem; but I so treat only those cases which exhibit the symptoms of dysmenorrhœa or of sterility.

The cases of hysteria which we meet with occur, in the great majority of cases, in sterile women or in unmarried women, and these are the ones in whom we are most likely to find anteflexion, and we therefore attribute to the flexion symptoms which are wholly constitutional. When a woman comes to me with dysmenorrhœa, I interfere. If she comes to me with sterility and she wishes to have children, I interfere; that is to say, I dilate the canal. I rarely use the stem pessary, and I always take careful antiseptic precautions, keeping the cervix immersed in a solution of carbolic acid or of bichloride of mercury during the whole process of dilatation. I have now operated three hundred and nineteen times, and without any serious results whatever.

In my early operations, before adopting antiseptic measures I occasionally had a localized inflammation, which, however, never amounted to anything serious. Now I meet with nothing of the kind except a little soreness. I am constantly and successfully treating, by massage and electricity alone, hysterical cases of anteflexion, that have had a prolonged local treatment before they came into my hands. Unless they have dysmenorrha, I do not treat them locally at all, and I never attempt to rectify the displacement, however bad it may be, unless symptoms are present which come from stenosis.

I have long ceased to cut the cervix; since I had a most melancholy result in one case I have given up the bloody operation—that is, Sims's operation. In this fatal case the patient died nine days afterward from pyæmia; it is true that antiseptics were not known then. I now always dilate, no matter what the condition of the fundus or of the cervix is, and I never resort to the knife. Dilatation will not always cure the flexion, but in every case it makes the avenue to the womb larger and almost always cures the dysmenorrhœa. I do not try to rectify the flexion, I do not care to; all I wish is to cure dysmenorrhœa,

and to give the woman a chance for impregnation, which will rectify the flexion better than anything else.

I am willing to concede that a very small percentage of cases of miscarriage is attributable to anteflexion, but far less than to retroversion or to retroflexion. Should, however, a woman have a series of miscarriages due to an anteflexed womb, I should try to rectify the displacement, and I should then prefer the stem pessary. I have practically ceased to use the vaginal pessary for anteflexion. The great trouble with it is, that it can replace the fundus only by making pressure upon it through the bladder, and that organ is too sensitive to stand the pressure. Women will bear one for a while and then it has to come out. In conclusion, I believe, in spite of Dr. Van de Warker's animadversions, although I respect his opinion, especially in matters in which mechanics and mechanical appliances come into play, I believe most firmly that anteflexion *per se* has no constitutional symptoms attributable to it, excepting those arising from dysmenorrhœa and its consequences, and from sterility and its consequences; in other words, the symptoms arising from stenosis.

Dr. Bache Emmet, of New York.—Though a regret has been expressed that Dr. Addis Emmet is not present at this meeting, I am sure that no one regrets it more than he, all the more could he be aware of the subject at present under discussion, and of the views which are here promulgated.

As a pupil of his, I am glad of the opportunity of setting forth his ideas on the subject of anteflexion, and I may also state that my own experience has fully demonstrated the correctness of those views. He holds the belief that by far the largest portion of flexions of the uterus have their origin in some surrounding pelvic inflammation, which by engorgement, exudation, and contraction ultimately deform the organ.

Anteflexion as such is not attended by pain; it is to these surrounding conditions that we must ascribe it; consequently, taking this view of the pathology, no cutting operation can be of permanent benefit unless to overcome the accompanying sterility.

There are cases in which pessaries may prove serviceable, but they do so, not by overcoming the anteflexion, but by simply raising the uterus to the plane of health in the pelvis. Such is admirably shown to be the case when we consider the great

distress about the bladder in a case of anteflexion. Here we make use of a pessary, but not one which will raise the fundus uteri from off the bladder; on the contrary, by carrying the cervix high up in the cul-de-sac by means of a straight lever pessary we intensify the displacement, yet we relieve the patient perfectly.

Dr. Gill Wiley, of New York.—I rise with some hesitancy, Mr. President, for the simple reason that I will have to place myself considerably in opposition to both Dr. Thomas and Dr. Hewitt, both more or less teachers of mine; but I certainly think they are wrong in their views—that is, in teaching and advocating what may be called the mechanical theory of displacements; I mean that the displacement is the disease.

It is now about five years ago that I wrote a paper entitled "Anteflexion and its Associated Pathological Conditions." Had I written on this subject without putting in anteflexion, I would not have been understood; but I put in the associated pathological conditions, because I found those conditions associated with anteflexion are the things to look at rather than the mere fact of the displacement. I think if we would call these cases all cases of imperfect development and cases of chronic endometritis, we would make better progress in the treatment and have fewer misunderstandings.

Although I have not entirely discarded the pessary, I certainly have discarded it so far as anteflexion or anterior displacements are concerned, except merely as palliative; and I obtain the support of the uterus with what I believe to be of more importance, stimulating treatment, looking at these cases as cases of imperfect development and chronic endometritis. I improve the general and local condition of the patient merely by stimulating treatment; then further by dilatation and drainage and not by a pessary. I believe that the good that comes from the stem pessary is not because it acts as a pessary at all in the sense of a mechanical agent, but because to get that stem in you have to dilate, and then when it is in you get better drainage; you stimulate the mucous membrane to an active condition, which, if the patient's general condition is kept good, may result in a cure, and that accounts for the great diversity of opinion in regard to the stem pessary. It is dangerous, there is no doubt,

if we make patients go around with it; no matter how it fits, they are liable to have attacks of local peritonitis, the result of sepsis from this mechanical action probably acting on the secretions and causing sepsis, and I have operated upon more than one case in which the salpingitis was the direct result of the insertion of a glass stem pessary. It is true there is often more or less good in a palliative way in the use of a pessary, but I find that the whole trouble is due to the pathological condition in the lining membrane and in the walls of the uterus.

As to whether you can have flexion without symptoms, I think in most cases there will be reflex symptoms, but we do find many cases in which there are practically no reflex symptoms.

I have discovered that if you take a case of anteflexion of the uterus, if there is no dysmenorrhœa, if you carefully pass a sound into the uterus, you will find no special sensibility at the os internum; but if there is dysmenorrhœa after such sounding you will have a scorching, burning pain somewhat similar to the pain of dysmenorrhœa. And I believe if we look at the pathological state as caused chiefly by want of development, stimulate it, dilate the os and keep good drainage, that we would cure dysmenorrhœa and sterility with no risk.

As to Sims's operation, I am satisfied that the results of it when it is carefully done are good, although for a long time I have practised it only in extreme cases, such cases as cannot be cured by dilatation; dilatation will cure the symptoms, but not always the flexion. You can often straighten the canal by a simple incision backward, but I think the force of the dilator should take the place of the knife. To Dr. Ball, of Brooklyn, belongs the credit of making practical the method of dilatation which is followed and very generally advocated. Ball's method of dilating, combined with Sims's operation, and not with a stem pessary but a drainage plug, in the most obstinate cases, has proved of great value. I often introduce into the uterus a hard-rubber stem, not to straighten it, but to secure drainage and bring about a change in the endometrium, leaving it in over one menstruation, and have got very good results; but I keep the patient either in bed or in her room while the drainage plug is in the uterus.

Dr. Thomas.—I will not detain the Society long, for the reason that we have already overstepped our limit. I have to

thank them very cordially for the kindness with which they have received my paper.

To Dr. Hewitt, I will say, if he will allow me to quote from a celebrated old English paper, that, upon this subject, praise from Sir Hubert Stanley is praise indeed.

To Dr. Priestley, I would say that he has presented very courteously and very fairly the conservative view with regard to this subject; he is, as always, loyal to his feelings, and yet I am sure I dissent, with his permission.

To Dr. Wilson, I would say that, if he objects to pessaries, he found them failures in the exact class of cases in which I found them failures.

To Dr. Van de Warker, who alluded to my change of base, and to my former attack upon him, I would say that I try to mend the fault of yesterday by the wisdom of to-day. Even as Saul of Tarsus was one day persecutor of the saints and the next a preacher of the gospel, I have learned better than when I made an attack upon his paper.

To Dr. Emmet, I would say that the tissues around a flexed uterus are generally tender, for the reason that the circulation is always disturbed. I would liken his position to that of a surgeon who, having to deal with a dislocated wrist, puts it in a sling and succeeds in relieving the pain, but I would remark that the pathological condition remains uncured.

In regard to Dr. Goodell's observation on Sims's operation, I think it is a great credit to his heart, but not to his head; emotion must be kept out of science. He says he has given up Sims's operation; I believe it is as much a mistake to give it up now, as it was a terrible mistake to practise it as frequently as was done ten years ago.

To Dr. Wiley, I would remark this: that I believe that his explanation of the stem is a mistake; that the stem does not give relief by acting upon the mucous membrane in the uterus; that it is not the distention of the canal, but that it is the altered circulation and innervation accomplished by elevating it.

And now, Mr. President, I will not detain you longer than simply again to thank the gentlemen for their very kind reception of my paper.

AMPUTATION OF THE CERVIX UTERI FOR CANCER. WITH CASES.

By Thaddeus A. Reamy, M.D.,
Cincinnati.

This paper shall be brief. It deals with my own clinical experience in the treatment of cancer of the cervix uteri during a special number of years.

The audience honoring me by its presence to-day is composed of men who do not need to be informed of the prevalence, possibly the growing prevalence, of cancer; of the sufferings which it forces upon its helpless victims; of its too often fatal issue, even when met by the most approved, and more efficient, modern methods of treatment. With all of this each of you is perfectly familiar. Nor could I be excused for consuming your time in considering speculations as to the causes of the disease under consideration. They are unknown. The statement that, up to the present time, the medical treatment of cancer in any form, at any stage, or in any part of the body, is unavailing, will not be successfully controverted.

I am aware that contrary opinions have within recent date been presented by high authority. Nevertheless, the lauded remedies have in almost every instance, in the hands of others, failed to stand the test of clinical experience. On the other hand, the success attending modern surgical methods of treatment has been sufficient to inspire the hope that, in a certain per cent. of cases, when subjected to treatment early, life may be saved. At the present time, therefore, this seems to be the only quarter to which we may look with expectation for the bow of promise. All reliable pathological and clinical evi-

dence goes to establish the fact that no treatment of this disease can be successful unless employed in its early stages. This truth is all the more important as applicable to cancer of the uterus. The facility with which the disease invades adjacent structures from this locality, and the anatomical barriers to following it into its fields of new invasion by removal, are quite apparent. These considerations should stimulate every practitioner to exercise the greatest diligence in making an early diagnosis, and to promptness in securing to the patient radical treatment. For brevity and convenience of study, I have tabulated the cases of cancer of the cervix upon which I operated, not for palliation, but with a view to cure, from June, 1876, to December, 1886.

At the annual meeting of the Ohio State Medical Society, held June 1, 1876, I reported the results of amputation of the cervix uteri for cancer, Case I. of that report then being well three years after operation. Within the past month I have learned that she is still living in the town of Racine, Ohio, and enjoys excellent health. It is now more than fifteen years since she was operated on.

Case III. of that report was operated on in May, 1874, and had no return of the disease, dying of pneumonia in 1879, five years after operation.

These cases may be properly quoted as bearing upon the value of the treatment advocated. (See *Transactions of the Ohio State Medical Society* for 1876.)

In the following cases, microscopic examination of the specimens was made in most instances, in every case in which there could be any possible doubt as to diagnosis, confirming the diagnosis made clinically.

The results obtained are certainly encouraging. In studying results, however, it is proper to consider that while in one view the cases were not selected, yet in another they were, since no case is included in the series in which I did not at the commencement of operation believe the disease to be not

advanced beyond successful removal. Of course, the extent to which the disease has advanced in any case can only be approximated until the progress of the operation reveals the true condition, and in some instances we may even then be deceived. Another fact is worthy of consideration. It has usually been held that exemption from the disease for two years after operation must be accepted as cure. An examination of the tables will show that recurrence took place within two years in two cases, within three years in two cases, within twenty months in one case, within twenty-three months in one case.

It is my belief that in these cases the disease still lurked in outlying structures, and that the disease was not, therefore, eradicated. This view must, of course, detract from the hopefulness of results.

Only cases that presented such conditions as were believed to render removal of the diseased structures possible, are included in the table.

Cases of malignant disease of the body of the uterus, and other cases in which the disease was so far advanced as to render any measures looking to removal of the diseased tissue useless, are excluded, as having no bearing upon our present study. When it is manifest that the disease has involved tissues which are not safely accessible to the knife, scissors, or the thermo-cautery, such cases being manifestly incurable should not be called upon to testify as to the value of any method proposed in the treatment of cases not so far advanced. Hence the exclusion of such cases. It is proper to state, however, that the number of such cases coming under my observation in private, hospital, and consultation practice, during the time embraced in this report, but not included, was about 250. This does not include nine cases upon which I have made vaginal hysterectomy, five of which have already been published in the *Transactions of the Ohio State Medical Society* for 1887.

Chronological Table.—Cases of Amputation of Cervix Uteri for Cancer.

No.	Age.	Married or single.	Number of children	Situation, extent, and probable duration of disease.	Character of operation made.	Results.	Subsequent history.	Place of operation.	Date.
1	49	Married.	9; 2 miscarriages	Portio vaginalis, meas. os, squamous epithelium; not extensive; 8 months.	Amputation with scissors not quite on level with cervico-vaginal junction.	Recovered.	Died of typhoid fever 14 mos. after operation, up to which time there had been no recurrence. N. 14 mos.	Good Samar. Hosp.	June, 1876
2	40	"	1; 3 abortions.	Portio vaginalis; extensive; had extended to anterior vaginal wall; left laceration of cervix.	Scissors and cutting gouge forceps scooped out to os internum; applied bromine.	"	Recurrence of disease in upper vaginal mucous membrane, and extending to parametric tissue. Died 13 months after operation.	Private house.	August, 1876
3	43	"	5	Vaginal portion of cervix; extensive; vaginal mucosa at junction; duration unknown.	High amputation, gouge forceps; bromine.	"	Gained 14 lbs. weight within 3 months; wound healed. Recurred in posterior wall 8 months after operation. Thermocautery. Death 18 months after operation.	Good Samar. Hosp.	October, 1876
4	39	"	No viable children born; 5 abort'ns	Left cervical laceration, severe; site of commencement of disease; uterus enlarged: durat'n probably 1 year; much hemorrhage.	High amputation; gouge forceps could not remove all diseased structures. Invasion of connective tissue right and left of cervix; may have been involvement of corpus.	"	Hemorrhage ceased; gained weight; never healed. Emaciation; hemorrhage; parenchymatous; nephritis. Death in 3 months after operation. R. 3 mos.	Private house.	Dec. 1876
5	34	"	1	Lower half of portio vaginalis; 6 months; left deep laceration.	Amputation to level of vaginal junction; cutting gouge forceps; bromine.	"	Died of phthisis pulmonalis 3 years after. Had been no recurrence. N. 3 years.	"	Dec. 1876
6	31	"	2	Portio vaginalis; not extensive.	Amputation with scissors, wedge-shaped to above level of vaginal junction. Closed flaps with silver wire; wire tent.	"	No recurrence had taken place in one year. Lost trace of case after that. N. 1 year.	Private hospital.	Feb. 1877

7	29	Married.	1 stillborn before marriage.	Portio vaginalis; extensive: bilateral laceration of cervix; 2 years.	High amputation; cutting gouge forceps; bromine.	Recovered.	Recurrence in 1 year. Death. R. 1 year.	Good Samar. Hosp.	May, 1877
8	60	"	8	Entire vaginal cervix.	High amputation with scissors.	"	No recurrence in 2 years. Died of cardiac disease N. 2 years.	Private hospital.	August, 1877
9	37	Single	None.	Entire cervix, but thought at time of oper'n it commenced to be limited; 1 yr.	Cutting gouge forceps and scissors to above os internum: peritoneal cavity opened.	"	Body was involved. Death in 6 months. R. 6 months.	Private house.	Nov. 1877
10	59	Married.	3; and 1 miscarriage.	Portio vaginalis; extensive; 15 months.	High amputation, cutting gouge forceps.	"	Recurrence in 14 months. Think patient died of cancer of liver, but history not clear. R. 14 months.	Private hospital.	Jan. 1878
11	63	"	7; and 2 miscarriages	Portio vaginalis; not extensive: commencing on posterior lip.	Amputation on level with vaginal junction; scissors; silver wire sutures.	"	No recurrence. Patient died in 13 months of apoplexy. N. 13 months.	"	March, 1878
12	40	"	3; and 1 abortion.	Portio vaginalis; extensive; anterior vaginal wall invaded.	Cutting gouge forceps and scissors: bromine.	"	Recurrence in 9 months. R. 9 months.	Good Samar. Hosp.	May, 1878
13	47	"	6	Double lacerat'n; posterior wall for 1 inch above os ulcerated: papillomat's growth from anterior wall.	High amputation, scissors; peritoneal cavity opened.	Died.	Died in 2 days. 2 days.	Private house.	August, 1878
14	49	"	9	Whole vaginal cervix; 1 year.	High amputation, scissors.	Recovered.	Recurrence. Death in 9 months. R. 9 months.	Private hospital.	October, 1878
15	34	"	3; and 2 abortions.	Portio vaginalis: not extensive: probably 6 months' duration.	Amputation at vaginal junction: stump covered by vaginal mucous membrane; stitched.	"	Saw this patient from time to time each year. Last examined her in May, 1887. N. 8 years. Healthy. N. 8 years.	Private house.	March, 1879
16	27	"	1	Portio vaginalis: rather extensive; papillomatous growth anterior lip; 1 year.	High amputation by cutting gouge forceps and scissors.	"	Under observation for 5 years. No recurrence. Health perfect. N. 5 yrs.	Private hospital.	June, 1879

CHRONOLOGICAL TABLE.—*Continued.*

No.	Age.	Married or single.	Number of children.	Situation, extent, and probable duration of disease.	Character of operation made.	Results.	Subsequent history.	Place of operation	Date.
17	37	Married.	4; and 2 abortions.	Portio vaginalis; one-half involved; left lateral laceration; disease originating at bottom of wound: Duration probably 1 year.	Supra-vaginal amputation by scissors.	Recovered.	No recurrence had taken place 4 years after. N. 4 years.	Private house.	June, 1879
18	40	"	2; and 1 miscarriage.	Cervix; extensive; bilateral laceration; duration 14 months.	Supra-vaginal amputation, scissors; Douglas's pouch opened; bladder laid bare, but not injured.	"	Apparent good health for 2 years. Recurrence and death 6 months after, or 30 months after operation R. 2 years.	Private hospital	October, 1879
19	34	"	3; and 2 abortions.	Portio vaginalis; extensive; duration 2 years.	Supra-vaginal amputation, scissors.	"	Examined patient 6 years after; in perfect health. N. 6 years.	"	Dec. 1879
20	35	"	2	Entire cervix; whole of vagina filled; so-called cauliflower excrescence; duration 1 year.	Removed with écraseur, followed by scraping with spoon saw; bromine and alcohol cotton tampon.	"	Apparent perfect health for 3 years; then recurrence. Death 6 months after, or 42 months after operation. R. 3 years.	"	Jan. 1880
21	39	"	4; and 1 miscarriage	Cervix; extensive; 15 months' duration.	Supra-vaginal amputation, scissors.	"	Recurrence in 23 months in parametric tissue. Death 6 months after. R. 3 yrs.	Private house.	May 1880
22	41	"	2; and 1 abortion.	Cervix; upper portion of vagina; extensive; 1 year.	Supra-vaginal amputation; Douglas's pouch opened; all diseased tissue apparently removed.	"	Healing apparent. Health much improved; gained 15 pounds weight. Recurrence in 9 months. Death 12 months after operation. R. 9 months.	"	July, 1880

23	33	Married.	2	Portio vaginalis all involved; duration 9 months.	Supra-vaginal amputation; wound closed with stitches silver wire; tent in cervix.	Recovered.	Recurrence in 4 years; death. R. 4 years.	Private house.	August, 1880
24	44	"	3; 2 abortions, and 3 miscarriages.	Cervix and posterior upper portion of vagina; extensive; 1 year.	Amputation, scissors; Douglas's pouch opened.	"	Recurrence in 20 months. Death in 4 months after, or 2 years after operation. R. 20 months.	Private hospital.	Jan. 1881
25	45	"	6	Cervix; extensive; more than a year.	Removal with gouge forceps and scissors; above os internum tunnelled out.	"	Apparent recovery. Could not learn definitely after 1 year, but heard on fair authority that death occurred in 16 months from operation, from cancer. R. 12 months.	"	March, 1881
26	33	"	2	Portio vaginalis; not extensive; 6 mos.	Swallow-forked amputation, infra-vaginal cervix; silver wire tent in cervix; flaps closed with catgut sutures.	"	Gave birth to healthy child 18 months after operation. No history of case afterward. Believe there was no recurrence. N. 2 years.	Private house.	June, 1881
27	37	"	2	Entire cervix; extensive; don't know.	Supra vaginal amputation with scissors.	"	No recurrence in 1 year; subsequent history unknown. N. 1 year.	"	July, 1881
28	54	"	5; and 1 miscarriage.	Entire cervix; extensive; probably 1 yr.	Supra-vaginal amputation with scissors; dissecting above os internum posteriorly and curetting uterine cavity.	"	No recurrence in 14 months; subsequent history unknown. Heard indefinitely of death from return of disease.	Private hospital.	August, 1881
29	39	"	1	Entire cervix; extensive; don't know.	Supra-vaginal amputation with scissors.	"	Recurrence in 5 months. Right side of stump. Actual cautery thoroughly applied; cure. No recurrence in 2 years. Returned in 3 years. Death.	Private house.	Sept. 1881
30	43	"	2	Portio vaginalis; extensive; 8 months.	Supra-vaginal amputation.	"	No recurrence. Heard from patient 3 months since, in perfect health. N. 7 years.	Good Samar. Hosp.	Sept. 1881

CHRONOLOGICAL TABLE.—*Continued.*

No.	Age.	Married or single.	Number of children.	Situation, extent, and probable duration of disease.	Character of operation made.	Results.	Subsequent history.	Place of operation.	Date.
31	38	Married.	5; and 1 miscarriage.	Entire cervix; upper vagina anter'ly and to right side; some enlargement right inguinal lymphatics.	Supra-vaginal amputation with scissors.	Recovered.	Recurrence in 1 year. Death 16 months after operation. R. 1 year.	Private house.	Dec. 1881
32	44	"	3	Entire cervix; 8 mos.	High amputation, gouge forceps; thermo-cautery.	"	Recurrence within 9 months, with death 3 months later. R. 9 months.	"	June, 1882
33	37	"	1; and 1 abortion.	Infra-vaginal; extensive; duration unknown.	High amputation with scissors.	"	Appeared well 9 months after. Subsequent history unknown.	Private hospital.	July, 1882
34	47	"	6 abortions; no living children	Cervix; extensive; duration 1 year.	High amputation; supposed all disease removed.	"	Discharge of blood continued. Health somewhat improved, but patient died from extension of disease 4 mos. after operation. 4 mos.	Private house.	August, 1882
35	30	"	1	Entire cervix; duration unknown.	Removed with scissors and thermo-cautery.	"	Recurrence and death within 9 months. 9 months.	Private hospital.	October, 1882
36	47	"	4	Entire cervix, with induration left side of vagina at junction with cervix; duration 1 year.	High amputation; thermo-cautery.	"	Recurrence in parametric tissue, with death in 1 year. 1 year.	"	April, 1883
37	33	"	3	Bilateral laceration portio vaginalis; duration unknown.	Amputation with anterior and posterior flap, carried to nearly level of os internum; closed with sutures; wire tent in cervix.	"	No recurrence. Gave birth to well-developed child 18 months after operation. Was well 3 months since. N. 5 years.	"	April, 1883

38	46	Married.	2	Cervix; extensive; duration unknown.	Supra-vaginal amputation with scissors.	Recovered.	Vaginal portion of wound in left side not healed in 3 months. Thermo-cautery. Complete recovery did not occur. Death in 12 months. from other causes. 1 year.	Private hospital.	July, 1883
39	39	"	2	Portio vaginalis, whole extent; 6 months' duration.	Supra-vaginal amputation closed with sutures.	"	No recurrence in 3 years. N. 3 years.	"	April, 1884
40	39	"	2; and 1 abortion.	Portio vaginalis; not extensive; 4 months' duration.	Amputation at level of cervico-vaginal junction; sutures and tent.	"	Had been no recurrence in 1887. N. 3 years.	"	July, 1884
41	38	"	1; and 2 abortions	Portio vaginalis; extensive; 8 months' duration.	Supra-vaginal amputation, scissors; peritoneal cavity not opened.	"	Had been no recurrence in Dec. 1887. 3 years.	"	Dec. 1884
42	43	"	3; and 2 miscarriages	Cervix; uterus enlarged; duration unknown.	Supra-vaginal amputation, scissors, followed by thermo-cautery.	"	No recurrence up to July, 1888. N. 3 years.	Good Samar. Hosp.	March, 1885
43	27	"	1	Entire cervix; duration 9 months.	Supra-vaginal amputation.	"	No recurrence in 9 months, but heard of patient's death abroad, from return of disease, 2 years after. R. 2 years.	Private house.	March, 1885
44	31	"	None	Portio vaginalis; duration unknown.	Supra-vaginal amputation; closed with sutures; wire tent.	"	No recurrence up to December, 1887. N 2 years.	Private hospital.	October. 1885
45	41	"	3	Entire cervix; duration 1 year.	Supra-vaginal amputation; Douglas's pouch opened.	"	Recurrence in parametric tissue, with death in 14 months. R. 1 year.	Private house.	Nov. 1885
46	50	"	None; 2 abortions.	Cervix; extensive; duration unknown.	Supra-vaginal amputation with scissors.	"	Patient well in March, 1888. N. 2 years.	Private hospital.	Nov. 1885
47	28	"	1	Portio vaginalis; duration 1 year.	Amputation, level of the vaginal junction.	"	Patient well in July, 1887, 2 years.	"	Dec. 1885
48	46	"	3	Entire cervix; duration 1 year.	Supra-vaginal amputation.	"	Recurrence and death in 8 months. 8 months.	Private house.	Jan. 1886

CHRONOLOGICAL TABLE.—*Concluded.*

No.	Age.	Married or single.	Number of children.	Situation, extent, and probable duration of disease.	Character of operation made.	Results.	Subsequent history.	Place of operation.	Date.
49	41	Married.	8	Entire cervix and upper vagina; duration 15 months.	Supra-vaginal amputation.	Recovered.	Recurrence in cellular tissue, upper portion of vagina, also in pelvis, with death in 12 months. R. 12 mos.	Private house.	April, 1886
50	42	"	4	Portio vaginalis; duration unknown.	Amputation below os internum.	"	Had been no recurrence in February, 1888. N. 2 years.	Private hospital.	April, 1886
51	39	"	5	Entire cervix; duration 15 months.	Supra-vaginal amputation; peritoneal cavity opened.	"	Recurrence in upper portion of vagina, and in pelvis, within 10 months. Time of death unknown. 10 months.	Private house.	May, 1886
52	42	"	4	Portio vagin'lis; cauliflower excrescence; Duration 1 year.	High amputation with scissors.	"	No recurrence in March, 1888. N. 2 years.	"	May, 1886
53	33	"	8	Entire cervix; bilateral laceration; duration 6 months.	Supra-vaginal amputation with scissors.	Died.	Died of septic peritonitis on 4th day.	Private hospital.	June, 1886
54	42	"	9	Entire cervix; duration unknown.	Supra-vaginal amputation with scissors.	Recovered.	No recurrence in April, 1887. N. 1 year.	Private house.	August, 1886
55	25	"	1	Portio vaginalis; duration unknown.	Amputation midway between vaginal junction and os internum.	"	No recurrence in January, 1888. N. 2 years.	Private hospital.	Dec.

It will be noted that the greater number of cases in the table were seen in my private hospital or at the patients' houses. The explanation is that, notwithstanding the fact that I have for the past eighteen years been on duty at the Good Samaritan Hospital, but few cases of uterine cancer in the early stages have been seen there. These cases generally find that retreat when beyond cure. My service on the staff of the Cincinnati Hospital did not commence until a year since.

I do not dwell at length upon my methods of operating, since they do not materially differ from those pursued with such excellent success by our able Fellow, Dr. Baker, of Boston. (See *American Journal of Obstetrics*, April, 1882.)

I may say, however, that formerly I used gouge forceps followed by the cautery, bromine, tampons, etc. Lately, however, I have employed almost exclusively the scissors, as enabling the operator to open the peritoneal cavity, if necessary, and to leave in the simpler cases cut surfaces in proper condition to be sutured. Moreover, bromine, chromic acid, etc., agents formerly employed after removal by the gouge forceps, cannot, of course, be employed in any case in which the peritoneal cavity is opened. My rule is to remove all diseased tissue when possible, and to reject all cases when I think this cannot be done.

It will be observed that in some instances, Case I. and Case XV. for example, supra-vaginal amputation was not done, but little more than the infra-vaginal portion of the cervix being removed; the anterior and posterior lines of incision respectively commencing at the vaginal junction, but extending upward to a line about midway between the level of the cervico-vaginal junction and the os internum, so that the upper portion of the cervix removed is wedge-shaped. This method, of course, leaves the os internum, in case of recovery, unimpaired, a matter of no inconsiderable importance. The criticism, however, is made, and certainly at first blush with much show of justice, that as we are dealing with a malignant disease, whose nature is to invade adjacent structures, and frequently in such an insidious manner as to render any line of

demarcation between diseased and healthy tissue undiscoverable even on section, we should make the incision as far beyond the diseased structures, in all directions, as anatomical barriers will allow. "Cut wide into healthy tissue," is the motto.

Certainly nothing is plainer than that unless all diseased structures are removed, the operation must be a failure. In the present instance, however, it will be noted that the cases so treated by me were cases in which the disease was confined, or seemed to be, to the lower part of the portio-vaginalis, not having reached superficially the vaginal junction. Under such circumstances, it may generally be assumed that the supra-vaginal portion has not been in the least affected, and if not involved, why need it be removed? Clinical observation confirmed by microscopical examination of specimens after removal in these cases, convinces me of the truth that, as a rule, when the disease commences near the os externum, as it so often does, just at the border between the squamous epithelium of the cervix and the transitional epithelium connecting this with the columnar epithelium of the cervical canal; or, for that matter, commencing anywhere below the vaginal junction, it follows the squamous epithelium up to the vaginal junction, and invades superficially the upper vaginal walls before the deeper cervical tissue is affected. And it is quite common for the submucous structures, the connective tissue with its lymph vessels and glands, found outside of the cervix on a level with the vaginal junction, to be diseased, while the mucous membrane of the cervical canal is yet unaffected, and all the supra-vaginal cervix remains healthy. I have, in quite a number of instances, verified this condition of things.

Williams, in the Harveian Lectures (London *Lancet*, January, 1886), has emphasized the same observation. So that here it is more important to cut widely than deeply. This statement must, however, be accepted in a qualified sense only, for it is now my custom, in every instance in which the disease has advanced as much as half way up the infra-

vaginal cervix, to cut through the mucous membrane to the right and left of the cervix on the same lines as though I were going to make vaginal hysterectomy, carrying the incisions upward, tying or compressing bloodvessels, as may be most convenient, and uniting the anterior and posterior incisions with these lateral incisions at a greater or less depth, according as each individual case may require. In this way we may often effectually guard against the recurrence of the disease in these directions—regions in which it is far more likely to recur than in the cervical stump. But, as before intimated, it is only of late that I have made these lateral incisions, except in cases in which the disease had manifestly extended well up the infra-vaginal portion. Cases reported by Pawlik in which the cervix was amputated by the galvano-cautery at the junction, and in which the disease did not recur, with cases of my own in which no recurrence took place after amputation at the vaginal junction by the écraseur, prove that, in a certain proportion of cases, the disease is absolutely local.

When the supra-vaginal cervix is not involved, what is the benefit to be derived from its removal? None, I apprehend, as we have seen. In these cases this is not the field of danger. Still more to be condemned, under such circumstances, is the total extirpation of the uterus. And yet, I feel justified in the conclusion that in many of the cases of total extirpation, followed by permanent cure of the disease, the above state of facts existed, and that less radical measures would have been equally successful. Of course, cases of cancer of the body of the uterus are to be excluded from the above statement. In but few of those cases is the vaginal portion of the cervix involved at all. But why, it may be asked, if no part of the supra-vaginal cervix is involved, do I now go above the vaginal junction? Why not remove the infra-vaginal portion with the écraseur, and thus avoid the removal of any tissue above that line?

I answer that, in most of these cases, such a course might be

proper. I have pursued it, in some cases, with success. I prefer the higher, wedge-shaped incision, however, for the following reasons :

First. It removes the epithelial tissues (superficial) in the lateral culs-de-sac along which the disease is wont to go, to a higher level.

Second. It removes the underlying connective tissue, which is, next after the epithelial structure, in this locality, most likely to be affected.

Third. This method leaves an anterior and posterior flap, to the cervical stump, which facilitates in every way the introduction of deep and superficial sutures, and the perfect coaptation of parts essential to an uninterrupted circulation and to union by first intention. Considerations of much importance, especially so in view of the fact that local irritation probably plays an important *role* in the exciting causes of cancer.

Fourth. Paradoxical though it may appear, the stump as felt from the vagina, in a year or two after the operation, presents a more natural conformation than in cases following amputation by a circular incision at the level of the vaginal junction. The importance of inserting a silver wire tent through the os internum, and allowing it to remain for a week or ten days, in order to prevent stenosis, in cases in which this method of operating is adopted, will readily be conceded. Of course, where the amputation is above the os internum this precaution is not so important.

It is my belief, after some experience, that in high amputation of the cervix we can more effectually remove the disease than by vaginal hysterectomy, except in cases of extension up the posterior cervical wall, and in cases of primary cancer of the body of the uterus.

In most instances the operator can more effectually and more safely remove the tissues outlying, both in relation to the disease and in the line of further invasion, by the minor operation than by the major one. The above conclusions are,

in my judgment, warranted by observations which I have made post-mortem in subjects who died after recurrence of the disease.

DISCUSSION.

Dr. W. H. Baker, of Boston.—Mr. President and gentlemen of the Society. In working out the steps of an operation for high amputation of the uterus for cancer, all I have been able to gain by such an operation is due primarily to the work that I learned from Dr. J. Marion Sims while his pupil at the Woman's Hospital. While I was house surgeon in that institution he was working at these cases by amputating with scissors, cutting out a cone-shaped piece of the supravaginal cervix and obtaining fair results, but at that time the Governing Board excluded all cases of cancer from the hospital, and the work so well begun was checked in its progress. When I began work in Boston I did amputation of the cervix by Sims's method, removing a cone-shaped portion from the level of the junction of the vagina and cervix, making the apex of that cone at a point a little beyond the level of the os internum. I found that this did not reach the entire disease in many cases, and I was led to unite with it a part of Schroeder's operation for the entire removal of the uterus; dissecting out the supravaginal cervix, by stripping back the vaginal peritoneum from behind, the vagina and bladder in front, making the level of the os internum the base of the cone removed, and carrying the apex of the cone up to the fundus uteri. It was thus possible to remove the entire cervix, both infra- and supra-vaginal portions, and also from one-third to one half of the body of the uterus.

I found by immediately closing the wound by silver sutures, that, although quick union was brought about, it was inadvisable, on account of the more speedy return of the disease. In this particular I doubt if this will quite agree with Dr. Reamy's remarks.

Although the touch is a valuable agent for detecting this disease, yet the denser tissues of the cervix, which sometimes exist, will often lead us to believe that we have removed all of

the disease, whereas, in reality, we have not cut away sufficient to insure against a return of the malady. It was on this account that I was led to apply the thermo-cautery at a red heat in every case after performing the operation already described, even though I felt confident at the time that a thorough removal had been accomplished.

I published the result of all the cases I had operated upon under this method, up to 1882, which Dr. Reamy has kindly referred to; the result of these cases was published then, and very likely is known to all of you. Subsequently, knowing that the value of these cases would be greatly enhanced by learning their condition after four years additional time had elapsed, in 1886 I reported the subsequent histories of these ten cases, and was able to show, from examinations which had been made within one or two months, either by myself or some well-recognized physician, that six out of the ten cases were then living and well, after a period of from something more than four to eight years. I have now a further report from these cases after an additional two years, and can state that five of the ten cases then reported are still living and well, after an interval of from six to ten years from the operation, one having died from some other disease, the details of which I have not been able to learn.

I think that the remark of Dr. Reamy is exceedingly well taken, that altogether too short a time has been recognized by operators as indicative of a cure of this disease.

I believe that this operation is certainly preferable to the total extirpation of the uterus, as Dr. Reamy has remarked, and that vaginal hysterectomy should be limited to cases in which cancer of the uterus begins in the body, as a primary disease, or where, in the exceptional case, it has extended from the cervix, upward instead of laterally, and the operator finds himself unable to remove the entire disease by high amputation.

I know of no disease with which we have to deal in which such persistent work must be done, and in which so much boldness, skill, and good judgment must be exercised to gain anything like a satisfactory result.

Dr. E. Van de Warker, of Syracuse, New York.—I cannot let this go by, this emphasis which is placed on the scissors and knife, instead of other agents to destroy the disease, without

remarking upon it. When you have made one operation by means of your scissors and knife, or cutting instrument, you have reached the limit of your usefulness; further operation by that method must cease, and we are handicapped by the conviction that we will have a relapse, and if you have placed your reliance upon the cutting agent, you are helpless to contend further with the disease. In the past few years I have taken particular pains to be able to do something for the relapse, and I have in my mind now a woman who has had seven relapses in a period of six years. She is a woman thirty-five years of age, and has a large family of children; and is of great use to her family and friends, and I have kept that woman on her feet by using the chemical cautery. Whenever I saw it sprouting out, I would break down all the friable tissue with my curette, and pack with chloride of zinc.

I place more emphasis on the chemical cautery than by excision by cutting instruments. It is remarkable how this woman gets upon her feet after repeated applications of the cautery. I will take her anæmic, with loss of appetite, etc., and before she is out of bed her complexion gets better, she is cheerful, and then she gets up and goes to work.

I think we have a better agent in the cautery than in the knife, in that we have an additional means of coping with the relapse.

Dr. John Byrne, of Brooklyn, New York.—Though the subject of Dr. Reamy's interesting and suggestive paper is one to which I have devoted much attention and for many years, yet, it seems to me that, at this stage of our deliberations, the time of this Society is too precious to permit of more than a mere reference to my experience in amputation of the cervix uteri for malignant disease.

I cannot allow the opportunity to pass, however, without recording—as I have repeatedly done before—my very decided preference for one particular means and method of conducting these operations, and that is, by galvano-cautery, *but not thermo-cautery.*

Nearly twenty years ago I adopted this method of excising and otherwise destroying cancerous disease of the uterus, and in

1879 I read a paper on the subject before the Society at its meeting in Boston.

Not only where the disease has been confined to the cervix, and where a long respite or permanent cure could be confidently looked for, but often—and more frequently—where the entire corpus has been involved, and palliative results alone contemplated, I have employed this agent exclusively. Thus, my operations by galvano-cautery for cancer of the uterus exceed three hundred in number.

With regard to my experience in the class of cases referred to in the paper of Dr. Reamy, I will state briefly that a very large percentage—I cannot at this moment say exactly how many—but a very large proportion of those operated upon by the galvano-cautery, where the disease has been limited to the portio vaginalis, have recovered completely. Indeed, one at least, after sixteen years, I know is living, while not a few may be considered as permanently cured, having had no relapse for from three to even ten years. Moreover, several have borne children, and in no single instance has any fatal result, or grave consequences, inflammatory or aseptic, followed my method of operating.

Where it is desired to perform what is understood as the high amputation, there is no difficulty whatever in doing so by the cautery. The cervix should be drawn down and an upward circular incision carefully made by the heated knife; further traction after a quarter of an inch in depth has been cut, will now bring the organ down to where a wire passing through will be in line with the os internum. Where there is any doubt, or where traction cannot be made, as in many of these cases, a wedge-shaped amputation can always be effected with the cautery knife.

Of the many attractive features observed in amputation of the cervix for limited carcinoma, there is one which I must not fail to note and that is, *I have never known an instance of relapse in which the disease has returned in the part from which it had been originally excised. I have repeatedly observed its reappearance in the fundus, ovaries, or some of the adjacent tissues, but I have never known a single instance in which the disease has reappeared on, or*

very close to, the cauterized surface from which the cervix has been excised by galvano-cautery.

I feel that I owe the profession an apology for having failed thus far to present the details of my very large work in this department; but, believing as I do, that a long time should be permitted to elapse before we are warranted in reporting cures, I trust this apparent neglect will not be without profit.

I hope within a short time to present the results of my labors in this direction.

Dr. Reamy.—In face of the anxiety I share with you to hear the President's address, I will be very brief in closing the discussion.

I wish first to refer to Dr. Van de Warker's work. His results have been marvellous, but he is mistaken in supposing that after amputation by the scissors, recurring disease is not attacked. Quite the contrary, the recurring disease is attacked by the chemical cautery or thermo-cautery, as the case may require. So my friend is mistaken when he says we are barred by this operation from the use of those secondary remedies of which he, himself, has so forcibly shown the efficacy.

In this same connection it will be remembered how effectual the after-treatment proved in the hands of Dr. Baker (See his paper read before the Alumni Association of the Woman's Hospital and published in the *Medical Record.*) He says that in every case he attacked recurring disease, as it appeared, with the thermo-cautery. I have done the same thing in many of my cases. Destroying by cautery or otherwise any appearance of recurrence will certainly constitute to a very large extent the success in finally curing these cases.

What is the advantage of the cutting primarily, and why not use the cautery primarily? Perhaps there is no such advantage. You can cut more clearly and define the line more certainly. The essential point is to find the disease early, recognize that it is probably local in its character, and so believing get beyond it if possible.

An important clinical fact emphasized by my cases is that it is a mistake to suppose that ordinarily, when we have cancer of the body, it is cancer of the body extended up from cancer of the cervix.

It may be proper, more clearly, to state that which I have already intimated, viz., a considerable number of my cases were seen early, and there were special reasons why they were seen early. Many of them were sent to me to be treated for so-called ulceration and for laceration of cervix, and other forms of uterine disease, not supposed to be cancer. Epithelioma of the cervix is probably always, at first, a local disease, and probably generally curable in this local stage. But probably a very large per cent. of the cases seen with a view to proper treatment by those who believe in the curability of cancer, are already incurable from delay. I believe that if, seen early enough, in many cases it can be followed by relief and radical cure, and to be successful we must recognize these facts.

In one of the most instructive works recently published, the Harveian Lectures, by John Williams, the author shows the value of the supravaginal amputation over hysterectomy or complete removal of the uterus, at least, in most cases, and, notwithstanding Dr. Baker's publication, this distinguished author referred to does not recognize the operation in this country. He quotes Pawlik, Martin, and Freitch, and justly states that the cases of the last two operators were not observed long enough; but he does not seem to know of the most reliable statistics of high cervical amputation that have been published. I refer to Dr. Baker's report, supplemented by the statistics of Dr. Van de Warker, to which reference was made a moment ago.

Dr. B. Emmett, of New York.—I would like to ask Dr. Reamy if he found cases of epithelioma in virgins.

Dr. Reamy.—One of my cases was in a woman that was not married—that is, she so reported; she has no children I know of, but it is a matter of doubt. I have seen two other cases of cancer of the cervix in virgins.

Dr. Emmett.—In what proportion of cases, in which cancer occurred after a lapse of time, was the first operation followed by primary union?

Dr. Reamy.—That only occurred in the cases in which the operation was done after the swallow-fork method, and the parts brought into perfect apposition, and the amputation not made as high as the os internum.

PRESSURE FORCEPS *VERSUS* THE LIGATURE AND THE SUTURE IN VAGINAL HYSTERECTOMY.

By E. C. Dudley, M.D.,
Chicago.

Total extirpation of the uterus has been performed so frequently during the past ten years, and the scientific character of its strongest advocates is of such high standing, that the question for consideration becomes, not so much whether the operation is justifiable, as what particular method of operation gives the best results. Until 1879, when the operation was revived in Germany, it was regarded by the whole profession as one of the most fatal in the entire field of surgery. The mortality prior to 1884, according to Mundé,[1] was 28 per cent. From 1881 to 1886 inclusive the combined statistics of Fritsch, Leopold, Ohlshausen, Schroeder (Hofmeier), Staude, and A. Martin comprise 311 cases, with 15.1 per cent. mortality.[2]

The mortality, therefore, under reasonably favorable conditions may be placed at about 15 per cent., a very favorable showing for an operation which only nine years ago was scarcely thought of except as a marvel of surgical audacity. Yet better than this, we have Leopold's record of 48 cases with a mortality of 6.2 per cent.[3] and, best of all, that of Klotz, 17 cases with no mortality whatever.[4]

[1] Transactions American Gynecological Society, 1884.

[2] Transactions Ninth International Medical Congress; Annals of Gynecology, November, 1887.

[3] Archiv für Gynäkologie, B. 30, p. 401.

[4] Medical and Surgical Reporter, Philadelphia, March 9, 1885.

But the possibility of today becomes the commonplace of tomorrow. The extraordinary results of Leopold and Klotz, therefore, may cease to be extraordinary as soon as the casualties incident to an unsettled technique can be avoided. We have in vaginal hysterectomy conditions of safety which do not pertain to abdominal section. The hand is not introduced into the abdominal cavity; the abdominal and pelvic viscera are very little exposed or disturbed; the wound is in a dependent position where the blood and secretions may gravitate and be discharged through a natural drainage-tube, the vagina. But certain difficulties must be overcome before the mortality of this operation can be reduced to the minimum. These difficulties are:

1. The great length of the operation.
2. Imperfect hemostasis.

The ligature, which is the means of hemostasis generally employed, is difficult to apply, is the chief factor in the duration of the operation and, as many a death from hemorrhage gives evidence, is unreliable. A reliable means of hemostasis, therefore, which could be quickly applied, would overcome both of these difficulties. Such a means of hemostasis is that practised by Péan, Richelot, and others, who dispense entirely with the ligature and control hemorrhage by means of pressure forceps.

The technique of the operation is as follows: The patient is placed in the lithotomy position, with the shoulders somewhat higher than the pelvis, in order that fluids may not gravitate toward the diaphragm, and a Simon's speculum introduced. The cervix is seized with strong vulsellum forceps, drawn down to the vulva, and a free incision is made through the vaginal mucous membrane with scissors, entirely around the cervix, at a safe distance from the diseased tissue. The loose tissues surrounding the cervix are now torn away from it by means of the finger or a blunt instrument, keeping as close to the uterus as the disease will permit, all troublesome hemorrhage being controlled by ordinary pressure for-

ceps. By this means the circum-uterine structures may be stripped back from the uterus until the exposure of the cervix is measured by a zone about three-quarters of an inch wide, extending to the lower margin of the broad ligament on either side. The uterus can now be drawn down much lower, and the dangerous territory of the ureters (which lie very close to the cervix, antero-laterally) will be more easily avoided in the subsequent steps of the operation. Then in the same manner the post-cervical structures are further separated from the cervix until the cul-de-sac of Douglas is reached. With the two index fingers in the cul-de-sac this opening may be easily enlarged by tearing laterally until it extends to the region of the broad ligament on either side. As soon as the opening has been made, two or three soft sponges, wrung out of hot water, should be forced into the pelvic cavity. They protect the pelvic viscera from exposure and accidental injury during the remainder of the operation, absorb the blood, and thereby prevent the formation of clots, which might be difficult to find; finally, the removal of these sponges completes the toilet of the peritoneum. A string attached to each sponge keeps it within control of the operator, if it should chance to work its way beyond the reach of the finger, where its removal might otherwise necessitate abdominal section.

An opening is likewise made into the peritoneal cavity, anterior to the uterus, by tearing with the fingers or blunt instrument as before, keeping close to the uterus to avoid wounding the ureters or bladder. This part of the operation may sometimes be facilitated by passing the index finger through the posterior opening and, if possible, hooking it over the broad ligament, so that it may serve in some degree as a guide, and thereby prevent the operator from wounding the bladder, ureters, or anterior uterine wall.

The two index fingers are now introduced through this opening, and it is also enlarged by tearing laterally until it extends to the region of the broad ligament on either side. Then the index finger of the left hand, or a blunt hook,

is hooked over the left broad ligament, the ligament is drawn down and seized by hemostatic forceps, the grasp being at a sufficient distance from the uterus to prevent the instruments from slipping off after the organ has been severed.

These forceps are constructed on the principle of Péan, but should be heavier and with jaws about two inches long. These forceps which I have here are intended for the broad ligament; the handles are curved to one side in order that when the ligament retracts the handle may not be thrown to the opposite side of the vulva, where it would be an impediment to the operator in completing the operation or in subsequent manipulations. Various broad ligament clamps have been devised, but none fulfils the indication better than the simple forceps.

When the forceps are securely locked, and the handles tied together with strong thread, to prevent them from springing apart, the ligament is severed close to the uterus, and the whole uterus pulled outside. The right broad ligament is then secured in the same way, and the uterus removed by a single stroke of the scissors. Should the operator desire also to remove the ovaries and Fallopian tubes, they may be secured by separate forceps, unless they have already been included in those which grasp the broad ligaments.

If, upon examination, the operator fears that the broad ligament is diseased beyond the grasp of the forceps, he may put on other forceps back of those first applied, which latter may then be removed and the suspected tissues cut away. This proceeding involves no material loss of time; but the application of the ligature as compared with that of the forceps, would always be difficult and tedious, and sometimes unreliable, or even impossible.

In some cases of unusual enlargement of the uterus, the ligaments on either side extend so high in the pelvis, that the blunt hook does not suffice to pull them down within the grasp of a single pair of forceps. Then one pair of forceps may be put on, and that part of the ligament in their grasp

divided. The uterus can then be drawn further down, and the remaining portion of the ligament, having been clamped by a second pair of forceps, may be severed.

Sometimes a few small vessels are wounded in separating the rectum and bladder from the uterus. These should be secured by small hemostatic forceps, applied before or after the removal of the uterus, according to the amount of hemorrhage, which is usually slight, and which becomes still less when the ligaments are clamped. These small vessels are more frequently encountered in the rectal than in the vesical wall and may give considerable annoyance, especially after the uterus has been removed and the traction upon the field of operation has ceased. In one of my own cases, in which the uterus was removed without difficulty in twelve minutes, a half hour was consumed in hunting for a small bleeding point in the rectal wall, and sixteen forceps were applied before complete hemostasis was secured.

In the ligature operation it is usual, after making the anterior and posterior openings, to bring the fundus down through one of them into the vagina, the object being to twist the ligaments into a rope as it were, thus making them smaller and more accessible for the ligature. However essential this procedure may be in the ligature operation, it is unnecessary with the forceps. Moreover, it is open to a serious objection; the peritoneal cavity is thereby invaded by the diseased cervix, and may become infected with malignant or septic disease. Besides, the body of the uterus, usually larger than the cervix, is an impediment to the operator when it is brought down into the vagina. It is possible that Leopold's light mortality may in a measure be explained by the fact that he never turns the uterus. Some of the German operators, several days, or immediately before operating, curette and disinfect the interior of the uterus, in order that when the cervix is turned into the peritoneal cavity infection may be avoided. This procedure must occasion loss of blood

and materially increase the danger, and should be dispensed with if the uterus is not to be turned.

The tendency, of late, has been to leave the peritoneal wound open for drainage and to discard the drainage-tube. Advocates of the open treatment say that unless the peritoneal margins be kept apart by the discharge of fluid from the cul-de-sac into the vagina, they fall together, and in a few hours become so agglutinated as to shut off the peritoneal cavity from the vaginal part of the wound. Most operators have little or no fear of the protrusion of the abdominal or pelvic viscera through the wound. The impression has prevailed that the open treatment will become an established feature of the operation. On the other hand, Dr. P. Reichel[1] records four cases which strikingly illustrate a grave objection to the open treatment of the wound. In all four cases symptoms of intestinal obstruction followed, two or three days after the operation. In two of these cases abdominal section was performed about the seventh day. The peritoneum was found injected, recent adhesions had formed in the pelvis minor, but no fluid; a considerable part of the lower portion of the ileum was strongly inflamed, lay deep in the pelvis minor and, together with its mesentery, was there firmly adherent to the margins of the wound, and in consequence of a sharp bending upon itself at one or more points had become obstructed. After freeing the adhesions, a constriction was found in that portion of the intestine which had been adherent, and above the constricted portion the ileum was extremely dilated with its contents, in one case, to the diameter of a man's arm. Below the constriction the bowel throughout was entirely empty. All attempts to force the contents from the dilated portion of the ileum, through the stricture into the bowel below, failed. Both patients died. In the other two cases, abdominal section was not performed, but the autopsy revealed conditions identical with the two already described.

[1] Zeitschrift für Geburtshülfe und Gynäkologie, Band xv., Heft i. S. 37. "Ileus nach Totalextirpation des Uterus."

Dr. Palmer Dudley reports a similar case[1] in which abdominal section with fatal result was performed for the relief of an ileo-vaginal fistula, which formed six months after the original operation.

Dr. Reichel insists upon careful closure of the wound as the best means of avoiding the three following accidents: 1 Protrusion of the intestine; 2. Infection of the peritoneum from the vagina; 3. Strong local peritonitis in the region of the wound with consequent adhesions and constriction of the intestine. He would cover the posterior portion of the vaginal wound after the method of Martin by union of the margins of the peritoneal and vaginal mucous membranes. For this purpose he uses a continuous catgut suture, and after the removal of the uterus would fix the stumps by suture in the angles of the wound. Then after sponging out the cul-de-sac, he would unite by suture the anterior with the posterior portion of the wound.

In two cases I have employed the hemostatic forceps, not only in hemostasis, but also in the closure of the wound, and they seem to fulfil the indications satisfactorily, although further trial will be necessary to determine their usefulness for this purpose. Closure of the wound with hemostatic forceps is effected as follows: After the uterus has been removed and all the bleeding points controlled, the forceps which clamps the broad ligament on either side is drawn down until the stump is exposed. Then the anterior and posterior peritoneal edges of the wound are approximated with a tenaculum in each hand, and fastened together at two or three points by means of light hemostatic forceps; additional forceps being applied also in each angle of the wound in such a way as to close the wound tightly around the stump, so that, if possible, that part of the ligament which is included in the grasp of the forceps shall be held down in the vaginal wound outside of the peritoneal cavity. These forceps suffice to hold the peritoneal edges of the wound in accurate coapta-

[1] New York Medical Journal, July 9, 1887.

tion until union has taken place, which occurs in a few hours unless there be fluid in the cul-de-sac, in which case the small spaces between the forceps will serve the purpose of drainage so long as drainage is necessary, and then also unite.

Thus, while union is taking place, the margins of the peritoneal wound are sufficiently immobilized to prevent the constant deviations of the rectum and bladder from disturbing the wound, and thereby contaminating it with septic infection during the healing process. A great disadvantage of the open treatment is thereby avoided. On the other hand, it is hoped that the great advantage of the open treatment, that is, drainage, will be secured by this method of closing the wound, because the forceps themselves in a surprising degree facilitate drainage. Any fluid finding its way to the little spaces between the forceps is promptly discharged along their course into the vagina.

The handles of all forceps should be tied together with strong thread to prevent them from snapping apart. The less important ones which have been applied for the purpose of securing small bleeding points, may be removed in twenty-four hours. The more important broad ligament forceps should be left forty-eight or seventy-two hours. It is possible that all might be removed in twenty-four hours with little or no danger of consequent hemorrhage. But there are two reasons for leaving them longer: 1. The wound secretions, always abundant during the first two or three days, readily find their way by continuity of surface along the track of the forceps, out through the vagina. The forceps, indeed, very effectively secure drainage. Their value as a means of drainage is scarcely secondary to their value as a means of hemostasis. Battlehner[1] shows that a solid body may be quite as good as a hollow tube for purposes of drainage. He has employed both rubber and glass tubes in vaginal hysterectomy, and has always observed that the wound secretions do

[1] Centralblatt für Gynäkologie, No. 42, 1885; American Journal of Obstetrics, 1886, p. 199.

not pass through the drainage-tube, but by the side of it. 2. The tissues grasped in the forceps are certain to slough, and this being the case, the sooner the sloughing tissue comes away the better. The longer the forceps are left, the longer the tissues will be compressed, and the more quickly they will slough. After two or three days, the tissues in their grasp will come off almost as soon as the forceps are removed, or some of them may possibly drop off without being removed at all.

The vaginal tampon of iodoform gauze as a last step in the operation, whether it be pushed into the cul-de-sac, or confined within the vagina itself, is of doubtful value. The vagina is an excellent drainage tube if left open, but the tampon impairs its efficacy as such. In one of my own cases the gauze, removed at the end of forty-eight hours, was found extremely fetid, and after its removal a quantity of offensive secretions immediately came away, which had been dammed back against the wound in consequence of the obstruction from the gauze. An antiseptic dressing may be placed over the vulva, around the handles of the forceps. Vaginal irrigation should not be practised during the first two or three days, or, if undertaken at all, should be used with extreme caution, lest fluid be forced into the abdominal cavity.

Certain difficulties which sometimes render the ligature operation exceedingly difficult and often impossible, are much more readily overcome by means of the forceps. These difficulties are encountered in cases of enlargement of the uterus, of excessive height or tenseness of the broad ligament, of small vagina, and of carcinoma having such large area that forceps have to be applied far to either side toward the pelvic wall.

In the majority of cases requiring vaginal hysterectomy, long-continued hemorrhages and anxiety of mind have already reduced nutrition, depressed vitality, and exhausted energy, all of which would powerfully contribute to profound shock and collapse, particularly if there were structural disease

of the heart or other important organs. The advantages, therefore, of the forceps operation will be apparent, inasmuch as an operation otherwise very long and tedious becomes very short and simple. Hemostasis is prompt and reliable, and the forceps, if properly applied, cannot slip off. Turning the cervix into the peritoneal cavity and bringing down the corpus uteri into the vagina, with its attendant danger, becomes unnecessary. The sloughing stump, if left in the vaginal wound below the peritoneum, comes away much more quickly under pressure forceps than under ligature. A clean granulating surface, therefore, more quickly takes the place of a gangrenous wound. Effective drainage is secured without the use of special appliances for that purpose. Convalescence, as a rule, is less complicated than when the operation is done with ligatures, sutures, drainage-tubes, and tampons. The operation certainly gives promise of reducing the mortality in carefully selected cases, to four or five per cent., possibly even less.

The following cases of vaginal hysterectomy with hemostasis by pressure forceps have recently come to my knowledge: Dr. James B. Hunter, two cases, recovered; Dr. Henry T. Byford, four cases, one death; Dr. James H. Etheridge, five cases, recovered; Dr. J. Algernon Temple, one case, recovered; Dr. E. C. Dudley, two cases, recovered. In Dr. Byford's fatal case, death occurred eighteen days after the operation; the autopsy showed no pathological condition which could account for death. The stumps were in healthy condition with no sign of sepsis or peritonitis. The patient had refused to eat and evidently died of starvation. Thus we have fourteen cases with one death, a mortality of seven per cent. In the fatal case death cannot be attributed to the operation.

This method of hemostasis will probably not be confined to simple hysterectomy. The following is quoted from a paper which I presented to the Chicago Gynecological Society, December 16, 1887:

"This operation may have a wider field than ordinary vaginal hysterectomy; I have determined in the next case I have of uterine myoma, in which supra-vaginal hysterectomy would ordinarily be performed, to open the abdomen, lift the tumor out through the abdominal wound, and then instead of using the serre-nœud, attempt to secure the broad ligaments by means of lock forceps in the vagina. It would probably be easy, by having the index and middle fingers in the pelvic cavity, one on each side of the broad ligament as a guide, to force the blades of the forceps through close to the uterus on either side of the ligament, to the finger-tips, and then having secured both ligaments, sever the anterior and posterior uterine attachments. The peritoneal edges of the vaginal wound might then be closed with a continuous catgut suture, or seized with lock forceps in the vagina, as already described. This method of performing hysterectomy for myoma, when the tumor is too large to be delivered through the vagina is worth trying; it would enable the operator to dispense with all extra-peritoneal methods of hemostasis, and might afford all the advantages which belong to intra-peritoneal hemostasis for ovariotomy."[1]

Some difficulty might be experienced in those myomata which by their growth have drawn the broad ligaments high out of the pelvis into the abdominal cavity, but in such cases the operator would first grasp the forceps from the abdominal side; two forceps, a little distance from one another on each side of the uterus, should be applied to each ligament. Then each ligament should be divided with scissors between its two

[1] The New York Medical Record, December 14, 1887, publishes a report of a case of laparo-myomotomy, made to the New York Pathological Society November 23, 1887, by Dr. Mary A. Dixon Jones, in which the stump was secured in the abdominal wound by means of Koberle's serre-nœud and the ordinary drainage tube introduced. The patient recovered, but was annoyed by the traction of the short pedicle upon the abdominal walls. In this report Dr. Jones suggested a modification of the operation by first liberating the vaginal wall, and then opening the abdomen and removing the entire organ: then closing the abdominal wound entirely and leaving the vaginal opening, as the most natural means of drainage. But in the above suggestion, pressure forceps, by which such a procedure would be made practicable, are not mentioned.

forceps, after which the ligament entire on either side could be grasped by one or more pairs of forceps introduced through the vagina. In many cases some enucleation and some ligatures might be required as a preparation for the successful application of the vaginal forceps.

The murderous mortality of hysterectomy for myoma has been consequent upon the great insecurity of any hitherto recognized method of intra-peritoneal hemostasis, which insecurity has necessitated the extra-peritoneal method. But the extra-peritoneal method, whether by serre-nœud, elastic ligature, or clamp, involves, *per se*, certain elements of danger. In proof of this we may mention the rapidly diminished mortality which followed in ovariotomy when the clamp was abandoned and the intra-peritoneal ligature substituted. If, therefore, by a safe method we could secure absolute hemostasis in myomotomy, without bringing the stump into the abdominal wound, history might repeat itself, and the mortality of hysterectomy for myoma might follow that of ovariotomy. Perhaps the solution of the whole problem may rest in the use of pressure forceps.

The use of pressure forceps for permanent hemostasis is generally credited to Richelot. The following letter from Péan was received in reply to my inquiry relative to the question of priority:

Bien cher confrère honoré:

Vous trouverez dans les cinq volumes de Leçons de Clinique Chirurgicale de l'hôpital St. Louis, tous les renseignements que vous desirez au sujet du pincement préventif temporaire et définitif des vaisseaux au cours de toutes les opérations chirurgicales.

A la fin du tome I vous trouverez les leçons que j'ai faites depuis plusieurs années, et qui ont été reproduites par mes internes MM. Deny et Exchaquet.

Au tome II vous trouverez plusieurs leçons cliniques que j'ai publiées pour établir l'historique et préciser les applications.

Dans le tome IV la deuxième et la troisième leçons sont consacrées a l'ablation de l'utérus par la voie vaginale; vous verrez, comme dans toutes mes opérations, que je pratique ce que je tire

alors du pincement des vaisseaux. Les leçons avaient été lues à l'Académie en Juillet, 1883.

Dans le même volume vous trouverez l'exposé de ma méthode appliquée a l'hystérectomie vaginale. (Aux leçons 11, 12, et 13.)

Dans le tome V, vous trouverez la réponse que j'ai faite au Congrès français de Chirurgie, au Docteur Richelot lorsqu'il a cherché à s'approprier la méthode que mes internes lui avaient communiquée, (à la page 213, 14me leçon) ainsi que les lettres du Docteur Buffet d'Elbœuf.

Les applaudissements de la salle entière ont empêché Richelot de continuer à marcher dans cette voie regrettable pour sa réputation.

En 1887, mon interne Monsieur Secheyron a eu le prix de l'Académie de Médecine de Paris pour son travail sur l'hystérectomie vaginale. Dans ce travail tous mes droits de priorité sont établis. Monsieur Richelot qui avait envoyé un travail sur le même sujet n'a eu aucune récompense.

Cette année-ci 1888, vous trouverez dans la Gazette des Hôpitaux une partie des leçons sur le morcellement et le pincement des vaisseaux que j'avais communiquée en 1873 à l'Académie de Médecine de Paris. J'y ai ajouté des figures pour mieux faire comprendre ma méthode a ceux, qui, vivant à l'étranger, comprennent moins bien le français que les descriptions ornées de figures.

Mon interne Monsieur Secheyron publie d'ailleurs, actuellement un important travail sur l'hysteréctomie vaginale, dans lequel vous trouverez prochainement tous les renseignements qui pourront vous intéresser sur ce sujet.

Croyez à monsieur, que je vous suis tout dévoué.

(Signed) PÉAN.

PARIS, 1 Août, 1888.

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DISCUSSION.

Dr. J. B. Hunter, of New York.—As Dr. Dudley has alluded to my two cases, I would like to add two others. I have used the forceps in four cases. There is no operation which is much more difficult than this one when done by the ligature. I devised a little instrument for putting a ligature around the broad ligament, which I use before putting on the forceps. I think there is less danger from hemorrhage in the use of the forceps. The broad ligament is a large mass to compress, and the forceps need to be strong. I have used those of Richelot, but have never been able to compress the whole of the broad ligament satisfactorily with one pair, and have generally used two or three. In one case I left on thirteen forceps for the first twenty-four hours. I think with improved forceps the operation will be made much simpler and safer. I can endorse the remarks which have been made about septicæmia in this connection; I had a case which died on the thirteenth day from septicæmia. I simply used iodoform gauze, and in forty-eight hours put in fresh gauze; no vaginal injection was given until after three or four days, and then very gently. I think, with care, the operation may be done in half an hour, and that we shall get better results from the forceps than from the ligature.

Dr. Henry T. Byford, of Chicago.—I have used the forceps in four out of eleven cases, but I still use ligatures whenever I can do so satisfactorily. Hemorrhage can be prevented as well by ligatures as by forceps. I had one case in which delirium

tremens came on a few hours after the operation; the patient got up and fought the nurse, and could not be controlled for about twenty-four hours. All but myself feared hemorrhage. I asserted positively that it would not occur, and it did not. But in these cases in which ligatures cannot be readily and satisfactorily applied the forceps have a valuable field.

Dr. Thaddeus A. Reamy of Cincinnati.—I have made nine vaginal hysterectomies and published five of them. I will simply call Dr. Dudley's attention to a point mentioned by Dr. Hunter, and that is this: If the cases he has operated upon, and will operate upon in the future, are like my own, he will find that it is impossible to compress the broad ligament with a single pair of forceps the size of those exhibited. By the time he has put in four or five pairs, the uterus, if much enlarged by this disease, will prevent his bringing it down, unless the vagina is unusually capacious. He must have instruments two or three times as strong as this one he exhibits, and the blades should be curved a little, and they ought also to be nearly parallel, so that they will compress at both ends alike. I make this remark not from trial, for I have never used the forceps to the exclusion of ligatures; I shall in my next case; I have been satisfied with ligatures, as I have had but one death. But I beg to state that the operation itself is attended with quite as little danger as ovariotomy; the shock is no more. But it is one thing to report that the patient did not die of the operation or after one, two, or three days, and quite another thing whether the operation has been useful, and whether the patient is cured of the disease for which it was done.

Now in using compression instead of ligatures, there are two things to be observed, to which I beg to call attention. If the compression is sufficient to control absolutely the hemorrhage, it is sufficient to destroy the vitality of the tissue if the forceps are kept on for a sufficient time. And herein will be the greatest utility of the compression, and you can limit the extent of your compression by the position of your forceps, and in order to destroy all the tissue grasped the forceps should be allowed to stay on until it sloughs. Thus diseased tissue may be destroyed beyond the line of incision. Of course, the primary object is the

arrest of hemorrhage, and the forceps should commence below and go up. The outer limit of safety should be the ureters.

As to inflammation of the peritoneum, so feared by the last speaker, I have seen no trouble from that quarter. I have employed the open treatment. I never did any stitching except in my first case. I never stitch the peritoneum to anything, but leave the entire cavity open, and now I do not put in any tampon, but leave it entirely free, and the wound heals up in a short time, except as it is kept open in some cases by the irritation of the sutures.

It is a lesson in drainage; exposing an enormous peritoneal surface without antiseptic methods. Probably the freedom of the drainage more than compensates for the absence of antiseptic agents.

Certainly the gate is open wide enough for the free admission of germs; but, if present, they seem to do no harm. In fact, an open drainage has virtues, but there is a tendency recently to deny it.

Professor Lane, of San Francisco.—I believe I was the first to perform the operation of vaginal hysterectomy in the United States. From having studied the matter I became convinced that the uterus could be enucleated without much trouble.

In reference to the operation, I think there must be a very careful discrimination in the selection of cases. I have operated fourteen times. My first case was in the month of November, in the year 1878, I think, and I have learned a good deal since that time. Those cases in which there is great trouble in getting hold of the uterus to ligate, are not fit ones for the ligature operation. In those cases in which the uterus is contracted and the disease has run beyond the surgeon's knife, compression is of no advantage. By making an incision in the cul-de-sac of Douglas in cases fitted for compression there is little difficulty in bringing the uterus down, and in bringing the broad ligament within an inch of the outlet of the vagina and tying. I never use the forceps, I tie with a strong cord. I first transfix with an instrument made for the purpose, an instrument something like a curved forceps, and then throw my ligature round and leave

the end remaining out. I found no difficulty in controlling hemorrhage.

In regard to the danger of the operation, I agree with the gentleman who last spoke, that it is one of the safest of capital operations. I have no deaths except one which died in forty-eight hours. All of the fourteen cases I operated upon are yet living and evidently are cured. I verified the disease with the microscope, and in every case it was epithelioma, and upon examination I found that the disease, though apparently very slight, reached much further in than it seemed from the outside.

There is a great difference in the formation of the womb in different women; it is much more difficult to operate on a large woman, one who has much adipose; in a slender woman, say a person who is rather slender and tall, in whom the pelvis is not large, the operation can be performed in twenty minutes.

I have always had some fear of cutting into the rectum in my primary incision, and I did in one case, but there was a great deal of adhesion.

Dr. Dudley.—In reply to Dr. Reamy's remarks, it may be said that one would hardly undertake the removal of the uterus for any other purpose than the radical cure. It is true that it is not always possible to hook the finger over the broad ligament, but the use of the blunt hook as a substitute for the finger has already been described in the paper. The difficulty of compressing the broad ligament exists, I think, rather in the imagination of those who have not undertaken to do it, than in the experience of those who have. Two or three forceps may be put on each broad ligament if one be insufficient.

Dr. Reamy is right in saying that a most important element in the use of the forceps is the destruction of such tissues as may be within their grasp, but this point was fully discussed in the paper. His idea that the large number of forceps sometimes required to secure hemostasis would be a serious impediment to the operation is contrary to experience. As many as twenty have been left in the vagina after this operation. In one case I used sixteen without inconvenience. Moreover, it would always

be possible to remove three or four pairs of forceps and substitute a single pair in their place.

I do not know that the forceps which I have presented are the best that could be devised; they have served the purpose well in my own cases. However, I am glad to hear from Dr. Reamy that he has thought of something better.

A CASE OF RUPTURE OF THE UTERUS IN LABOR AT TERM, THE CHILD BEING BORN ALIVE.

Recovery of the Mother, and Subsequent Delivery of a Full-term Child in Normal Labor.

By Charles M. Green, M.D.,
Boston.

Recovery from rupture of the uterus in labor is stated by most authorities to occur in only five or ten per cent. of the cases; and in this small proportion of recoveries, whether or not owing to conditions consequent upon the uterine rupture, subsequent pregnancy and parturition are extremely rare. Parvin,[1] in a paper read before this Society in 1878, mentions the case of Lambron, who, "in 1775, performed gastrotomy in a case seventeen hours after the rupture, in 1779 repeated the operation upon the same patient, who, in 1781, gave birth to a living child *per vias naturales*." Doubtless occasional instances of recovery from rupture, with subsequent pregnancy, have occurred from time to time; but in the literature of the last ten years I have been able to find only four well-authenticated cases.

Wenzel[2] quotes from the *Transactions of the Medical Society of Wisconsin* the cases of Marston and Moore. In Marston's case the uterus ruptured spontaneously in the sixth labor, and the fœtal head escaped through the rent: a dead child was extracted by the vagina, and the mother recovered. Sixteen

[1] Transactions American Gynecological Society, vol. iii. p. 308.
[2] American Journal of Obstetrics, vol. xv. p. 374, 1882.

months later the woman miscarried at the fourth month, and eight months thereafter she was prematurely delivered at the sixth month. Eleven months later she was taken in labor at term: after four hours of labor the uterus ruptured again at the seat of the former tear, and the woman died in twenty-four hours. In Moore's case spontaneous rupture occurred in the fourth labor, and the patient recovered. In 1880, five years later, the same patient suffered a second rupture, and the delivery of the child was followed by intestinal hernia through the rent: the intestine was replaced, and the woman recovered.

Lawrence[1] reports a case of spontaneous rupture in a multipara with a flat pelvis, the child being delivered by version, and the placenta extracted from the abdominal cavity: there was no prolapse of intestine. The woman was kept under morphine, had only moderate peritonitis, and got up on the fourteenth day perfectly well. Dr. Lawrence subsequently delivered her of a premature child, and another pregnancy followed.

In February, 1888, McLean[2] reported to the Obstetrical Society of New York that he had recently delivered by version a patient whose uterus had been ruptured in her previous labor, the fœtus escaping into the peritoneal cavity and being extracted through the rent.

The history of my own case is as follows:

Mrs. F., a native of Newfoundland, was delivered of her first child, a girl weighing nine pounds, in May, 1883, when she was twenty-eight years of age. Nothing is known by me of this labor except that it was long, that the forceps was used, that the cervix was lacerated bilaterally to the vaginal junction, and that the child lived to be over a year old. These few facts, however, in the light of my subsequent knowledge of the patient, lead me to believe that the child probably presented in an anterior position, that the force of the uterine contractions was not sufficient to drive the head into the pelvis and dilate the os uteri, and that

[1] British Medical Journal, vol. ii. p. 601, 1885.

[2] American Journal of Obstetrics, vol. xx. p. 401, 1888.

the forceps was applied at the superior strait and the head delivered through an imperfectly dilated cervix.

At midnight, December 18, 1884, Mrs. F. was taken in her second labor, and was attended by Mr. C. D. Jones, of the Harvard Medical School. The head presented O. L. A. The pains were relatively inefficient, and in the afternoon of the 19th Mr. Jones summoned me to the case with a view to instrumental interference. The forceps was applied at the superior strait, and a living male child weighing nine pounds was delivered with moderate difficulty. At this time I did not measure the pelvis; but it was obviously contracted in the conjugate diameter of the brim. The convalescence was tedious; but the case was dismissed in three weeks, the condition of the mother and child being good.

At 2.30 A. M., December 28, 1886, Mrs. F. was taken in labor with her third child, and was seen an hour later by Mr. G. W. H. Libby, of the Harvard Medical School. The head was found presenting above the brim O. D. P., and the os was the size of a quarter dollar. Four hours later the membranes ruptured spontaneously; but the head did not engage, and seven hours after the beginning of labor no apparent progress had been made. Gradually, however, the head extended, the brow entered the pelvis, and a large caput succedaneum formed on the left frontal bone. The cervix became thick and œdematous, and the os dilated to the size of a silver dollar. Recognizing the gravity of the case, Mr. Libby sent for Dr. Edward Reynolds, Assistant in Obstetrics in the Harvard Medical School. Dr. Reynolds found that the student had correctly diagnosticated the fœtal position and presentation, and he also found that the cervix had been so deeply lacerated in previous labor, especially on the right side, toward which the occiput was directed, that any operative interference must necessarily be attended with a considerable risk of an extensive tear into the lower uterine segment: he therefore asked me to see the case with him.

On my arrival, twelve hours after labor had begun, the condition of the woman was good, and the child was living. As the occiput was above the brim and in posterior position, the use of forceps was considered inadvisable by both Dr. Reynolds and myself. Podalic version was evidently the most favorable

operation for the child; but the deep laceration of the cervix, and the probable thinning of the lower uterine segment after twelve hours of obstructed labor, made this operation hazardous. Craniotomy on a living child we especially wished to avoid in a Roman Catholic family. After careful consultation, and fully realizing the risk of the mother, we decided, nevertheless, to perform version in the interest of the child. Dr. Reynolds passed his hand into the uterus and brought down a foot without especial difficulty: the contraction ring was not marked, but the lower segment was thin. The extraction of the child was undertaken by myself, Dr. Reynolds following down the uterus and exerting supra-pupic pressure. Some difficulty was experienced in delivering the arms, as they became extended (it was found later that the right shoulder was dislocated), and a considerable pressure was necessarily exerted over the head to force it through the brim, but altogether the delivery did not exceed fifteen minutes. A male infant weighing nine pounds was born in a state of asphyxia, and some twenty minutes were required to establish respiration.

While I was resuscitating the child, Dr. Reynolds took charge of the uterus and found it contracted to such a degree that he supposed the placenta had already been extruded into the vagina; but on introducing his hand to remove it, he found to his amazement, that the placenta was in neither uterus nor vagina, but that the cord led up to and through a rent in the lower uterine segment on the right side. Carefully disinfecting his hand, and dilating the rent which had closed firmly upon the cord, he found the placenta among the intestines and removed it with membranes entire: there was no difficulty in the withdrawal of the hand or placenta. The uterus contracted firmly, and there was no intestinal hernia and no hemorrhage. The woman was in a condition of profound shock, and her pulse was 150. Brandy was given subcutaneously, and six hours later the pulse had dropped to 120.

Being asked for my prognosis by the student in charge, my answer was that, if the patient survived the primary shock (which had already in a great measure passed off), she would undoubtedly have peritonitis, from which there was certainly a

good chance of recovery: septicæmia she ought not to have, as throughout the case the most careful precautions had been taken: undoubtedly there were some blood-clots in the peritoneal cavity; but the peritoneum is very tolerant of aseptic blood, and the liquor amnii had entirely drained away before the child was extracted: no hemorrhage whatever had occurred externally, and there were no symptoms of concealed hemorrhage, showing that most fortunately no large vessels had been torn. The case would, therefore, resolve itself into one of traumatic peritonitis, from which the patient ought to recover, if her strength could be sustained. Even were the patient in the best of hygienic surroundings, it would not seem advisable to me in this instance to perform laparotomy to close the rent in the uterus; nature would undoubtedly do this in thirty-six hours or less. Moreover, with firm uterine contraction maintained, there would be little risk of the escape of lochia into the peritoneum, when there was a free exit through the cervix. Should subsequent symptoms point to a purulent accumulation in the abdominal cavity, drainage by the vagina, or perhaps laparotomy, would have to be considered. My directions were to give opium freely, and to support the strength with stimulants and liquid food.

The next morning I found the patient under the influence of opium, with a pulse of 110 and a normal temperature. The temperature gradually rose, however, and on the fourth day reached 102°, with the pulse at 120. The abdomen was extremely tender, swollen, and tympanitic, and the patient complained of great pain if the opium was not pushed. A sublimated douche was given every day, and brandy, milk, and eggs constituted the dietetic treatment. On the sixth day there was some vomiting, a passage from the bowels took place, and there was profuse sweating. Next day the temperature reached 103.8°, and the pulse 130; but from this time progress toward recovery was uninterrupted. The patient was dressed on the fourteenth day, and on the next day, with a normal temperature, resumed her household duties. Of course, the patient was still weak when she left her bed, and suffered for a time with pain in the right iliac region and over the bladder, which was somewhat irritable. I saw her occasionally during the next two weeks, and had the

perhaps undeserved satisfaction of being told by her, when the baby was a month old, that she was in perfect health, and never felt better in her life. Throughout the case Mr. Libby was untiring in his devoted attention and intelligent care, and to him belongs the chief credit of the successful result.

The pelvis was now for the first time measured with care: it was found to belong to the generally contracted, flat, rachitic type; the contraction in the transverse diameter was moderate, and the true conjugate of the brim was 3.5 inches. The woman was small in stature, but presented no evidences of rickets other than those shown in the pelvis.

Just when and how the rupture occurred in this case is uncertain: Dr. Reynolds was not conscious of the accident at the time of the version. The chin came down on the right side and perhaps caused the tear, although probably not, as it is doubtful if the head could have passed the brim unless it were well flexed. Possibly my efforts in releasing the arms caused the tear; but my own belief is that the powerful suprapubic pressure, exerted under my direction to drive the head through the brim, forced the placenta through the thinned lower segment on the right side before the head had passed through the pelvic canal.

In the recovery of the patient the element of chance played a large part: had large vessels been torn, the case would have been lost by primary hemorrhage; had not the liquor amnii drained away before the rupture occurred, and had, therefore, quantities of meconium and fœtal débris entered the peritoneal cavity, the result might have been quite different. It is with no small satisfaction that I point to the absence of any symptom of septicæmia; for a patient subjected to examinations by three different men, undergoing the operations of podalic version and manual extraction, having her uterus ruptured and the placenta manually extracted from the abdominal cavity, could hardly fail to be infected, if all that came in contact with her genital canal were not aseptic. If, however, as shown to be possible in this case, septicæmia can

be eliminated from the dangers of ruptured uterus, the prognosis is very decidedly improved, and will depend on the amount of shock, hemorrhage, and subsequent peritonitis, and on the patient's general strength and power of endurance. Practically, therefore, a few hours should settle the prognosis: if the patient does not die in a short time from shock and hemorrhage, the chance of recovery is certainly not a bad one.

It is not my purpose in this communication to discuss the propriety of laparotomy after rupture of the uterus; but the cases in which that operation is indicated are, it seems to me, those in which there is a continued, moderate hemorrhage, which is sure to exsanguinate the patient if neglected, and those in which the fœtus has escaped into the abdominal cavity, either wholly, or to such a degree that extraction by vagina through the rent is inadvisable. In such cases it is justifiable to expose the patient to the added shock of gastrotomy for the purpose of removing the child, tying bleeding points, and perhaps suturing the rent in the uterus. If the tear is extensive and does not involve the lower segment below the proper place for amputation, and especially if the uterine musculature has become friable, removal of the uterus would seem to be the proper treatment. If much detritus has entered the abdominal cavity, or if the child has partially escaped therein, irrigation through the rent and the use of suitable drainage have given very good results in foreign hospitals, especially so in the hands of Frommel.

In regard to the obstetric treatment of such a case as this, I would not again run so great a risk to the mother for the sake of the child. I would attempt by gentle manipulation to rotate the head to an anterior position and then apply high forceps; failing in this manœuvre, as I think I should have done in this instance, I would either do craniotomy, or, if I did version, would make the extraction more slowly, with only moderate supra-pubic pressure, even if thereby the child were lost.

At midnight, January 8, 1888, about two years after recovery from the uterine rupture, Mrs. F. was taken in her fourth labor. Mr. L. B. Clark, of the Harvard Medical School, attended her, and unfortunately was unable to make an accurate diagnosis of the fœtal position, as the patient insisted on keeping a kneeling posture by her bed. It was ascertained that the position was right, but whether anterior or posterior is uncertain. Believing, as I do, that nearly all right positions are primarily posterior, it seems probable that anterior rotation took place while the woman was in the posture favorable to that movement, namely, while on her knees by the bedside. At all events the woman was normally delivered of an eight pound girl, occiput anterior, after twelve hours of labor, just before my arrival. I took charge of the third stage of labor, and thought I could detect through the abdominal wall on the right side of the uterus a somewhat thickened ridge at the seat of the previous rupture. The placenta was extruded by the normal efforts of the uterus, and the subsequent convalescence was uneventful.

It is interesting to regard the obstetric history of this patient in connection with the pelvic measurements. The children were all large. In the first two labors the head presented in anterior position, and although the pelvic contraction was such that the unaided power of the uterine and abdominal muscles was unable to force the head of a nine pound child through the superior strait, the head engaged, nevertheless, and was in both instances safely delivered with high forceps. In the third labor, however, the position was posterior, and it was impossible for the biparietal diameter of a child weighing nine pounds to engage in the diminished chord subtending the sacro-iliac arch contracted by both transverse and antero-posterior narrowing, and which even in normal pelves is less than the oblique diameter through which the biparietal passes in anterior positions. Meeting with resistance, therefore, on the occiput, the head extended and sought to enter the pelvis by its frontal diameter, establishing the brow presentation with which we had to deal. In the fourth labor the child

weighed one pound less, and perhaps would have passed the brim even in a posterior position; but the posture of the woman probably promoted anterior rotation before the head entered the pelvis, and the head then passed through the most favorable pelvic diameters, propelled only by nature's efforts.

DISCUSSION.

Dr. T. Parvin, of Philadelphia.—The case is interesting as proving that abdominal section is unnecessary after some cases of rupture of the uterus, and spontaneous recovery may be so complete that the organ proves itself as perfect in childbearing as before the injury.

There is no treatment for ruptures of the uterus in childbirth, and the question to be settled is in what cases should the abdomen be opened, and in what simple drainage by the vagina can be relied upon; certainly the results obtained by the latter in recent years are very encouraging. Probably the solution of the question is this, that where the tear is in such a position that vaginal drainage is perfect, the abdomen need not be opened; but if such drainage is impossible, or imperfect, then section is indicated.

ON THE SEVERE VOMITING OF PREGNANCY.

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"It seems to me that an hypothesis is *developed* into a theory solely by explaining an ample lot of facts."—Darwin's *Life and Letters*, vol. ii. page 286. (To Asa Gray.)

It is with great diffidence that I venture to bring the subject of the severe vomiting of pregnancy before this high medical tribunal; a subject which has been very frequently discussed by authors and practitioners in the department of obstetrics, and concerning which various and very opposite opinions are entertained. The questions involved are highly interesting, not simply because of the supposed intractability of the disease, but also because of the extreme desirability, from a scientific point of view, of removing, if it be possible, some of the obscurity as to the nature and causes of the malady. And although much has been written, there is so little agreement on the question, that at the present moment there is as much necessity as ever there has been for ample, full, and free discussion of the subject.

The association of sickness with pregnancy is so common that it is generally looked upon as a part of it. Between the condition of a patient who is pregnant and moderately sick, and that condition in which this patient is affected with such severe vomiting that life is endangered; there are all degrees, and, as is well known, not unfrequently the malady, even when in a very severe form, suddenly and unexpectedly gives way, and the danger is at an end. It is difficult to say where the line should be drawn between physiological vomiting, as it

may be termed, and pathological vomiting; indeed, the vomiting would appear to be of the same kind and of the same nature in the two classes of cases. The presumption is natural that the difference between cases of slight and cases of severe vomiting of pregnancy is only one of degree. The fact that what may be termed a spontaneous cure is sometimes observed even in bad cases, naturally lessens the respect of the practitioner for a malady, which one day threatens life and the next it may be is as if it had not been.

On the other hand, we cannot forget that patients do occasionally perish from the severity of this disease, nor can we shut our eyes to the fact that by not a few practitioners of celebrity, the only way out of the difficulty, and the only chance of safety for the patient is held to be the induction of abortion and the evacuation of the contents of the uterus; a proof that the condition to which the patient may be reduced by severe vomiting of pregnancy is occasionally such as to warrant an operation not of itself without its risks, and which has, indeed, in not a few instances, proved fatal, although it may have relieved the vomiting.

There is an old axiom to the effect that a sick pregnancy is a safe one. This is surely a mistake, for it is certainly not the fact that all sick pregnancies end well, and, on the other hand, pregnancies entirely free from sickness are not by any means rare.

A circumstance which complicates the investigation of the pathology of severe vomiting in pregnancy is the fact that severe vomiting may occur during pregnancy, having for its cause disease of some organ other than the uterus, and apparently entirely unconnected with the pregnancy, which is in such cases an accidental accompaniment. This distinction was pointed out some years ago by Anquetin. We have to recognize, therefore, that there are cases of severe—even fatal—vomiting *in* pregnancy, and that there are cases of severe vomiting, also possibly fatal, *of* pregnancy.

The first question is, How we shall classify the cases which

have been recorded? One series of cases consists of those in which some lesion has been found on post-mortem examination sufficient to account for the vomiting without necessity for recourse to the idea that the vomiting was due solely to the pregnancy. There are a few such cases on record—about twenty-four in number. Concerning these it is to be remarked, that the evidence is not conclusive in all of them that the lesions mentioned, chronic gastritis (one case), redness and softening of the stomach (one), injection of gastric mucous membrane (? three), and some others in the list, can be accepted as responsible for the fatal event. It may be suggested that, so far as gastric changes are concerned, probably the gastric lesions may have been more an effect of the vomiting than a cause thereof. I have seen cases of vomiting in which there was no pregnancy, but in which the vomiting was unquestionably uterine, in which the continued vomiting occasionally gave rise to hematemesis, which was apparently a mechanical result of the frequent straining, and in which probably the stomach would, on a post-mortem examination, have exhibited injections of the lining mucous membrane.

The following table (I.) contains twenty-three cases in which, with more or less degree of certainty, the vomiting was not actually due to pregnancy *per se*.

There are instances in this table of the presence of cancer at the pylorus or its neighborhood, tubercle of the brain, fatty degeneration of liver, impaction of biliary calculus, etc., in which the vomiting was probably rightly explained by the presence of the lesions mentioned. Most of the cases coming under this category which I have been able to collect in this table are taken from the treatise by Anquetin; a few additional cases I have collected. Among these additional cases is one by Dr. Matthews Duncan, in which the patient's disease is described as "icterus gravis." This case is the more important as it has been made by that eminent authority the basis of a generalization on the vomiting of pregnancy which requires particular examination and discussion.

TABLE I—SEVERE VOMITING IN PREGNANCY. FATAL CASES. AUTOPSY. LESIONS NON-UTERINE.

No.	Author.	Lesion (state of uterus not mentioned).
1	Valleix, from Anquetin "Des vomissements incoërcibles pendant la grossesse," Rev. Méd. 1865	Chronic gastritis.
2	Taurin, Ibid.	
3	Dubois, Ibid.	
4	Chomel, Ibid. . . .	Redness and softening of stomach.
5	Sandras, Ibid.	
6	Depaul, Ibid. . . .	Cancer of pylorus.
7	Pipelet, Ibid. . . .	Epigastric hernia.
8	Lancereaux, Ibid. . .	Atrophy of muscles, etc.
9	Trousseau, Ibid.. . .	Scirrhous induration near pylorus.
10	Schutbach, Ibid. . .	Tumor near pylorus, ulcerated.
11	Schilachigla, Ibid. . .	Tubercle of lung.
12	Rayer and Depaul, Ibid. .	Tubercle of brain.
13	Sandras, Ibid. . . .	Alleviation of mesenteric glands.
14	Blot, Ibid.	Alteration of glands of epigastrium.
15	Chomel, Ibid. . . .	Fatty degeneration of liver.
16	Taurin, Ibid. . . .	Biliary calculi.
17	Lobstein, Ibid. . . .	Redness of semilunar ganglia of solar plexus.
18	Sandras, Ibid. . . .	Congestion of meninges.
19	Burns, Ibid. . . .	Impaction of biliary calculus.
20	Harrinson, letter to author .	Disease of adrenals.
21	Matthews Duncan. Lectures on "Diseases of Women" . .	"Icterus gravis."
22	Horrocks, British Med. Journ., July 4, 1885 . . .	Primary encephaloid carcinoma of liver.
23	Horwitz, Ztschr. f. Geb. und Gyn., 1883, Case 5 . . .	Polypoid disease of the intestines.

Dr. Matthews Duncan thus classifies the vomiting of pregnancy. There are at least two kinds:

1. The common kind, almost certainly the result of morbid innervation, whether it is a reflected sensation or a reflected motion, or the result of a reflected secretion, is frequently very grievous, perhaps sometimes even fatal. It is arrested when the fœtus dies, or by abortion, or delivery at full time. No grave disorder, but deficient nutrition.

2. The pernicious vomiting, concerning which our knowledge is extremely imperfect; of this disease Dr. Matthews Duncan gives a case.

Dr. Duncan's[1] case is as follows:

The patient, aged thirty-four years, was pregnant for the second time. The first pregnancy ended in a miscarriage after the second month, at which time she had jaundice. Present illness began five weeks before admission; symptoms, vomiting and headache. Severe vomiting and jaundice now present. Jaundice general, but slight; has had wandering delirium. Bile in urine, albumen one-fifth; casts. Hiccough; wandering, dreamy state. Twenty-one days after admission tangle tent introduced; left sixteen hours. Next day a second tangle tent with sponge to retain it was introduced; ergot given. Died that day. Liver two pounds two ounces; small, soft, partly green surface; color on section brown; no lobules seen; emphysematous. Kidneys flabby, congested; decomposed fœtus of six weeks in utero. Held to be three months pregnant.

Dr. Duncan considers this a case of "icterus gravis," formerly called yellow atrophy of liver. He states that physiologists have recently discovered that in healthy pregnancy the earliest stage of this disease occurs. The great glands of the body, especially the liver, undergo in healthy pregnancy and in healthy suckling a certain degree of parenchymatous degeneration. This is the first stage of the grave disease mentioned. The grand indications of icterus gravis are peculiar convulsions, jaundice, and hemorrhage. Vomiting is not always present, nor even sickness, though both are generally well marked.

Dr. Roughton, *Lancet*, Sept. 5, 1885, reports a case in which a young woman, aged twenty years, had severe pregnancy vomiting, also slight jaundice. Two days after admission attack of shouting and throwing about of arms, more like an hysterical attack than epileptic fit. Attack recurred thrice, followed by semi-delirious state. Abortion induced next day. Result favorable. It is stated that the uterus was normal. The author argues on the same ground as that taken

[1] Lectures on Diseases of Women, 3d ed., p. 295.

up by Dr. Matthews Duncan, that in normal pregnancy "it has recently been shown" that the great glands undergo cloudy marking, almost identical with the first stage of Bright's disease and of acute yellow atrophy of the liver. According as this change proceeds further in the kidneys or the liver, we get eclampsia or the pernicious vomiting of pregnancy. In Dr. Roughton's case there was no post-mortem examination, and consequently no proof of an existing liver affection.

What, it may be asked, are the foundations for the generalization suggested by Dr. Matthews Duncan and Dr. Roughton? In a very interesting article recently published, Lomer[1] discusses the subject of icterus gravidarum and acute yellow liver atrophy. As to the relation the acute yellow liver atrophy bears to icterus gravidarum there are, according to Lomer, three opinions: 1. That it is the result of a general infection. 2. That it is an essential primary liver affection. 3. That the disease is developed out of icterus, and that it is strikingly like phosphorus poisoning. Thierfelder found that out of 143 cases of acute yellow atrophy of the liver 30 were pregnant women. Regarding the absolute frequency of the conditions, Spaeth found it once in 16,502 pregnant women. He found icterus only 3 times in 14,061 pregnant women. Kerksig, in 1704, describes an epidemic of icterus affecting 70 patients, of whom 5 were pregnant; 3 aborted and 2 died. Carpentier saw an epidemic at Koubaix which was only dangerous to pregnant women. Bardinet mentions an epidemic at Limoges which included 13 pregnant women, of whom 3 died with delirium and coma. The disease affected others also, but in the case of pregnant women it had an exceptional severity. Lomer states that the most striking symptom in this epidemic was a catarrhal icterus, often fatal in pregnant women. Frerichs believes icterus to be the beginning of

[1] Ueber die Bedeutung des Icterus Gravidarum für Mutter und Kind. Zeitschr. Geb. und Gyn., xiii. Bd., 1 Heft, S. 169.

acute yellow liver atrophy. Lomer states that there must be something more than mere bile retention to give rise to the severe results observed in pregnant women. He suggests that the explanation is probably to be sought in the altered relation of the nutrition changes in pregnancy, and that there is an unusual susceptibility to poisonous influences in pregnant women. The biliary acids passing into the blood act in the pregnant woman differently, and thus the result is accounted for. The biliary acids are, Lomer states, capable like phosphorus of producing disintegration of the blood-corpuscles.

The cases of Dr. Matthews Duncan and Dr. Roughton appear to be of a rare and exceptional character. The suggestion which is implied by the manner in which they are recorded, is that a certain pathological alteration in the great glands of the body is probably a principal factor in the production of the vomiting of pregnancy.

These cases and opinions must be studied along with the facts and observations contained in Lomer's paper above quoted. It will then become evident that the disease spoken of by Lomer is one of a very distinct character, affecting men as well as women, but proving unusually fatal to women in the state of pregnancy. There is the greatest possible difference between this disease described by Lomer and the severe vomiting of pregnancy, which, as cases abundantly show, is often a curable—indeed, a self-curing disease, and the phenomena of which have generally a distinct relationship to what may be termed the mechanical history of pregnancy. The sickness is often suddenly relieved as the uterus rises up out of the pelvis; patients who have been so ill as to be given up for lost have, nevertheless, recovered and got rid of the sickness. Why is this? If the sickness depended on some serious disease of the liver, it could hardly be so suddenly and completely cured, as we know to be the case in not a few instances. Cases of icterus gravis during pregnancy, accompanied or not by vomiting, must undoubtedly be admitted to

exist. The fact of their existence cannot, however, in the face of Lomer's statistics, lend any sanction for the adoption of the generalization which, on the basis of Dr. Matthews Duncan's one case, appears to be offered for acceptance, viz., that the ordinary severe sickness of pregnancy has for its foundation a mild form of that disease known as icterus gravis. Icterus gravis must be regarded as a rare condition, essentially different from the more common but severe vomiting, which in some instances is capable of bringing about a fatal termination in the course of pregnancy.

Other General Possible Causes of Severe Sickness in Pregnancy.

Emotion and *shock*, of which fatal cases have been related by Dr. Barnes.

Alcoholism, of which an interesting case was related by Dr. Edis. The patient was cured of the sickness by dealing with the alcoholism.

Bright's disease might, it is quite conceivable, give rise to excessive vomiting in pregnancy.

Cases in which the State of the Uterus was Recorded.

The next series of cases to be analyzed are those in which severe vomiting having been present during pregnancy the state of the uterus has been noted. The object of this analysis is to determine whether there can be shown to exist any connection between morbid conditions of the uterus and severe pregnancy vomiting.

Seeing that it is the uterus which is mainly concerned in the process of pregnancy, seeing that this organ undergoes vast and important changes in pregnancy, seeing that severe vomiting when present during pregnancy almost invariably comes to an end and ceases when the contents of the uterus are, by the spontaneous act of the uterus, or by artificial interference, evacuated, it seems natural to conclude that it is

highly probable that the sickness may be connected with some condition of the uterus interfering with the easy and normal changes which it is essential the uterus should pass through in the course of its growth and expansion during gestation. I may remark, that some years ago, Anquetin, whose memoir I have already quoted, expressed an opinion to the effect that alterations in the uterus would probably prove to be the chief cause of severe vomiting.

I have collected from various sources over fifty cases of severe vomiting in which the physical condition of the uterus has been recorded, and important alterations discovered by observations during life and after death. There are several other cases recorded which are valueless so far as this inquiry is concerned, because no mention is made of the state of the uterus.

The changes in the uterus which have to be considered are: changes of

Position,
Shape,
Texture,
Contents.

The possible presence also of inflammatory effusions in the vicinity of the uterus must be included in the consideration.

The data supplied in recorded cases are various, and few cases have been recorded which supply data in desirable fulness. I have arranged the available cases in classes with the object of drawing some definite conclusion from them as regards the frequency of association of various alterations of position, shape, texture, or contents of the uterus with the severe vomiting in pregnancy.

Cases of Severe Vomiting associated with Retroflexion or Retroversion of the Gravid Uterus.

In a former paper I cited four cases of this kind. There are now to be added seven further cases, making a total of eleven cases.

TABLE II.—SEVERE VOMITING IN PREGNANCY, ASSOCIATED WITH RETROVERSION OR RETROFLEXION OF GRAVID UTERUS.[1]

No.	Author.	State of uterus.	Treatment	Results.
1	Stoltz, Case 2, Gaz Méd., Jan., 1852.	Uterus in third month retroverted but movable.	Sickness suspended several times on replacement. Uterus could not be retained in proper position.	Artificial abortion. Recovery.
2	Briau and Moreau, Gaz. Hebd., July, 1856.	Incomplete retroversion; incarceration in bony pelvis.	Raising out of pelvis by manipulation.	Cure.
3	Grailey Hewitt, "Diseases of Women," 4th ed., p. 365.	Uterus retroflexed but movable.	Hodge pessary; relief of sickness. Recurrence month later from slipping of pessary. Speedy relief on readjustment. Second recurrence after a month from same cause.	Abortion at six months Recovery.
4	Grailey Hewitt, Ibid., p. 368.	Much retroflexed.	Treated by prone position.	Cure.
5	Godson, letter to author.	Retroversion and flexion easily tilted into position, but falling back again immediately.	Treated by Hodge pessary.	Never sick afterward.
6	Halliday Croom, letter to author.	Gravid retroflexion at three and a half months.	Treatment not stated.	
7	Upsher, Amer. Journ. Obst., 1884, p. 915.	Retroversion tenth week.	Treatment by Hodge pessary.	Relief.
8	H. F. Campbell, Amer. Gyn. Trans., 1885.	Extreme gravid retroversion: salivation, vomiting.	Frequent genu-pectoral position followed by manipulation.	Immediate relief.
9	H. F. Campbell, Ibid.	Gravid retroversion.	Genu-pectoral position and Barnes's bag.	Cure.
10	H. F. Campbell, Ibid.	Extreme retroversion, firmly packed in hollow of sacrum.	Reduction by manipulation.	Cure.
11	H. F. Campbell, Ibid.	Gravid retroversion.	Genu-pectoral position and abdominal succussion, reduction pessary.	Cure.

[1] The first four cases in above table were related in a former paper, see Trans. Obst. Soc. of London, for 1884. The last seven cases have been collected since

The following are the particulars of the seven fresh cases:

Dr. Clement Godson. (Letter to author.)

Case I.—"I met with an obstinate case of vomiting just lately at St. Bartholomew's, at two and a half months, in which the uterus was retroverted and flexed, but easily tilted into position—falling back again immediately, however. I inserted a Hodge, remarking to my class that it was a good test case for your theory of the causation of the vomiting of pregnancy. The patient was never sick afterward. I thought you would like to know this. Clement Godson."

March 5, 1885.

Dr. Halliday Croom. (Letter to author.)

Case II.—Curiously, all the years I have been in obstetric practice, I have never seen a case of uncontrollable vomiting, except one, and that was one I saw in consultation, and turned out to be gravid retroflexion at three and a half months.

J. Halliday Croom.

Edinburgh, May 23, 1885.

Case III. (Dr. John C. Upshur. *American Journal of Obstetrics*, 1884, p. 915.)—Patient aged twenty-four, primipara, vomiting began seventh week, ended tenth week. Internal remedies failed. Retroversion discovered in tenth week. Relieved by Hodge's double lever closed pessary. Previous to insertion of pessary, condition became steadily worse, becoming more prostrated and disgust for food increasing daily.

Case IV. (Dr. Henry F. Campbell, Augusta, Georgia. *Amer. Gynec. Trans.*, 1885.)—Patient, aged forty years. Nausea, inability to take food, occasional vomiting, and most distressing salivation. In bed six weeks; bearing-down pains, irritation of bladder about fourth month. The uterus found in state of extreme gravid retroversion. Treatment consisted in frequent genu-pectoral positions. This failing, patient was placed in this position, and after elevating perineum to allow air to enter vagina, the cervix was pressed backward by finger. Reposition at once effected. Immediate cessation of nausea and salivation. Delivery at term.

Case V. (Dr. H. F. Campbell.)—Gravid retroversion, fourth month, vomiting frequent, nausea incessant. Treatment, use of genu-pectoral position combined with use of large size Barnes's bag placed in the rectum. Reduction. Cure.

Case VI. (Dr. H. F. Campbell.)—Primipara, third month, nausea extreme from time of conception. Morphia only gave partial relief. Uterus in state of extreme retroversion and firmly packed in hollow of sacrum, and somewhat tender. Patient had had a tent just introduced to induce abortion. This was withdrawn, the genu-pectoral position used, and uterus "jostled" out of the hollow of the sacrum. Nausea ceased; no abortion occurred. Delivery full term.

Case VII. (Dr. H. F. Campbell.)—Gravid retroversion, fundus tender; aged twenty-five years; in third month. Nausea and vomiting in extreme degree, great distress, emaciation. Patient in despairing state. Genu-pectoral position and moderate abdominal succussion at once gave relief, uterus becoming replaced. Pessary applied. Cure. Delivery full term.

I propose to comment upon these cases later on.

Cases of Severe Vomiting associated with Anteversion or Anteflexion of the Gravid Uterus.

In a former paper, published four years ago, I mentioned twenty-three cases in which anteversion or flexion of the gravid uterus was associated with severe vomiting. I now report eight other cases coming under this description:

Case I. (Dr. Henry F. Campbell, Augusta, Georgia.)—Two months advanced, first pregnancy. Extreme nausea from date of conception; nausea and debility great. Patient was in convalescence from fever. Consultation as to procuring abortion. Gravid uterus found in a state of decided anteversion; fundus resting heavily upon the pubes and compressing the bladder. Morphia found ineffectual. Patient placed in genu-pectoral position, and full and complete reduction was made and a gum elastic ring pessary applied. Nausea and vomiting soon ceased. Delivery at term.

Case II. (Dr. Grailey Hewitt.)—Mrs. A. B., aged twenty-two years, primipara. Treated before pregnancy for dysmenorrhœa, anteversion, and flexion. Sickness soon set in on occurrence of pregnancy, quieted at first by opiates. During second month sickness controlled by horizontal position, uterus occupying a low position and pressing downward. At beginning of third month, after an exertion, severe sickness set in and the uterus which had begun to rise up was found much lower, felt hard and painful to touch from vagina. Following day patient very ill. Two attempts made to push up uterus through vaginal roof, with only partial relief; resistance to pressure very considerable. Sensation of numbness. During night sickness most violent; uterus found to have descended again. Condition one of great prostration and much pain. A spherical air-ball pessary was placed in vagina and distended to two inches diameter. In two hours patient felt comfortable. Morphia suppositories and nutrient enemata had been employed unavailingly. Next day patient better; air-ball removed after twenty hours' use, vagina injected antiseptically, and pessary re-introduced. Uterus found higher, os had moved forward. Following day no sickness, slight escape of fluid from vagina, pessary removed at bed-time, it being thought that possibly liquor amnii had escaped. Next day patient not so well. Consultation. Morphia and atropine used as suppositories; hot vaginal injections. Bromide and chloral at bed-time. Next day some sleep during night. Uterus again pushed up by fingers, being found low down in pelvis. Nine days after recurrence of the vomiting had followed the exertion patient better, but uterus felt still very low; it had now assumed an oblique position in pelvis, os being toward right sacro-iliac synchondrosis and fundus to left forward. Fundus tender, no discharge. No medication for five days; uterine body hard, rather too low in oblique diameter. Three days later, tenderness to left side of vaginal roof. Inserted air-ball pessary for four hours. Next day tenderness less. During last week of third month uterus pushed upward a little on alternate days, this being found to relieve pain present. Patient allowed to stand, but pain recurred, as also nausea. Uterine artery left side felt pulsating violently, but as uterus was raised pulsation natural; this fact noticed several times.

After this, little treatment was required except occasional elevation of uterus, and the uterus gradually assumed a more natural position. Patient went out at end of the fourth month. No more sickness. Delivery at term.

Case III. (Dr. W. Doe, *Boston Med. and Surg. Journal*, Feb. 10, 1886).—Patient aged twenty-four years. Two children. Vomiting began first week, lasted till just before death at end of twelfth week. Nausea constant and intense, and vomiting of a thin, yellowish fluid every two or three hours. Great emaciation, ptyalism, breath offensive, tenderness over epigastrium and œsophagus; pulse 116, temperature 97°. Cervix firm and unyielding; os only slightly patulous. Uterus markedly anteverted, the fundus resting against the rami of the pubes, and on examination could be raised up out of the cavity of the pelvis, but fell back again directly upon the removal of the finger. Considered to be three months advanced. Nutrition by enemata.

A consultation held; the question of artificial abortion considered. She was considered too weak too bear the shock, and the possibility of hemorrhage or septicæmia.

"In favor of delay, and trusting to other means, was the fact that in her preceding pregnancy the nausea and vomiting, though much less severe yielded suddenly and completely at the beginning of the fourth month after the attending physician had on vaginal examination by chance raised the uterus high up out of the cavity of the pelvis." Further the reporter says: "As soon as the pressure was permanently removed by raising the body of the uterus out of the pelvic cavity, the vomiting and nausea instantly ceased. A peculiar feature illustrating the principle of cause and effect here was that as soon as the vaginal tampons were at all displaced so as to allow the body to prolapse and antevert, the nausea and vomiting would directly return."

The exciting cause of the vomiting in this case seemed to be wholly the displacement of the uterus, and consequent pressure upon the pelvic parts. Tincture of iodine had been applied to the cervix without effect.

Case IV. (Dr. Augustus F. Clark, *Journal American Medical Association*, May 23, 1885.)—Patient aged twenty-one. Married September, 1867. Sent for February 21, 1868. Excessive vomiting, could retain nothing. Greatly depressed, pulse rapid, sometimes over 140. "Cervix was small and uterus somewhat anteflexed." Had experienced from time to time a good deal of dysuria, traces of albumin. Nutrient enemata used for a time, but on March 1st believed to be dying; abortion at once procured by a gum bougie left some hours. Next day recovery.

Case V. (Dr. W. H. Veatch, *Peoria Medical Monthly*, 1884, page 682; 1885, page 687.)—Primipara aged twenty-seven. Vomiting began in third week, not troublesome till fifteenth week, when vaginal examination made and showed extreme anteversion. Patient refused to have attempt at replacement made, cervix cauterized. Failure up to twentieth week, when abortion occurred. No vomiting after first indication of abortion. Death one week after from septicæmia.

Case VI. (Dr. de Voe, *American Journal of Obstetrics*, August, 1884, page 638.)—Patient aged twenty-four. Second pregnancy. At three months repeated vomiting, hæmatemesis, hæmoptysis, inanition. Fundus low down against pubes, or high and well back against rectum, soft, patulous, eroded, much leucorrhœa. July 19th, applications of nitrate of silver. July 27th, slightly better, faradization of stomach twice a day. August 9th, considerable improvement, but cannot sit or stand. As preliminary to use of a Thomas anteversion pessary, uterus turned well back and held in retroposition for several minutes, pessary applied. Progress normal afterward. Labor at full term.

Three cases are given illustrative of "a new method of treating the vomiting of pregnancy."

Case VII. (Dr. William Duncan, *Lancet*, 1887, vol. ii. page 754.)—Patient aged nineteen, primipara. Sick one month, two months pregnant. *Uterus marked by anteflexion and decidedly tender when pressure made on cervix.* Vagina freely painted with fifteen per cent. solution of cocaine, and by probe and cotton wool also inside of canal to three-quarters of an inch. A placebo administered also. No vomiting after taking the latter. "The vomiting stopped without any interference with the flexion."

TABLE III.—SEVERE VOMITING IN PREGNANCY, ASSOCIATED WITH ANTEFLEXION OR ANTEVERSION OF THE GRAVID UTERUS. PRESENCE OR ABSENCE OF IMPACTION IN PELVIS. (Order chronological.)[1]

No	Author.	Time of severe vomiting.	Uterus impacted, incarcerated, or detained in pelvis	Summary of treatment and results.
1	Stoltz, Case 1, Gaz. Med., June, 1852.	3d month.	Impaction.	Relief on raising uterus. Projected abortion given up. Five days later vomiting again intense. Abortion not induced, patient too weak. Death.
2	Ulrich, Monat. für Geb., 1858	End 3d month.	Impaction, irreducible.	Many fruitless attempts to reduce uterus. In three weeks death. Autopsy. The difficulty in expansion due to the flexion was. Ulrich states, the cause of the vomiting.
3	Grailey Hewitt, Obstet. Trans., vol. xii.	4th month.	Detention	Rest in horizontal position. Cure natural.
4	Mongo, Glasgow Med. Journ., Aug. 1872	3d month.	Impaction, irreducible	Artificial abortion. Recovery.
5	McClintock, Dublin Med. Journ., May, 1873	3d month.	Detention?	Artificial abortion. Recovery.
6	Skerritt; G. Hewitt, Dis. of Women, 4th ed., p. 367.	3d month.	Detention, in process of relief.	Rest in horizontal position. Cure.
7	Copeman, British Med. Journ., May, 1875	?	?	Copeman's dilatation. Cure
8	Copeman, British Med. Journ., Nov. 1875	5 months	Detention.	Cure on raising uterus.
9	Copeman, British Med. Journ., Sept. 1878	3d month.	Detention.	Cure on raising uterus (next day os was slightly dilated).
10	Grailey Hewitt, 1879.	6th month.	Uterus obliquely jam'd in pelvis	Rest; horizontal position. Miscarriage at seventh month.
11	Grailey Hewitt, 1879.	End 2d month	Not impacted.	Excessive induration of cervix. Copeman's dilatation. Relief. Death later.
12	Grailey Hewitt, Dis. of Women, 4th ed., p. 368.	4th month.	?	Attempts had been made to induce abortion. Result of case not known.
13	Grailey Hewitt, Ibid., p. 369.	3d month.	Jammed very low down.	Rest in bed. Cure.
14	Herwitz, Zsch. für Geb. und Gyn., 1886, Case 1.	End 3d month	Impaction.	Reduction very difficult, giving much pain. Tampons. Abortion followed. Recovery.

[1] Cases 1 to 22 related in a previous paper. Cases 23 to 30 collected since.

No.	Author.	Time of severe vomiting.	Uterus impacted, incarcerated, or detained in pelvis.	Summary of treatment and results.
15	Horwitz, Ztsch. für Geb. und Gyn., 1886, Case 2.	3d month.	Impaction, irreducible.	Abortion suggested, not carried out. Death.
16	Horwitz, Ibid., Case 4.	?	Do. apparently irreducible.	Abortion induced. Death (query, disease of stomach?).
17	Horwitz, Ibid., Case 7.	3 months.	Impaction.	Reduced with great difficulty, giving great pain. Tampons. Abortion induced. Recovery.
18	Horwitz, Ibid., Case 8.	3d month.	?	Sedatives, scarification, caustics. Abortion induced. Recovery.
19	Horwitz, Ibid., Case 9.	3d month.	Impaction.	Correction gives great pain. Copeman's dilatation no effect. Abortion induced. Cure.
20	Horwitz, Ibid., Case 10.	End 2d month.	Impaction.	Attempts at reduction very painful. Copeman's plan, temporary success. Abortion induced. Death speedily.
21	Haslett, Brit. Med. Journ., March, 1884.	2 months	Impaction, irreducible.	Abortion induced. Cure.
22	Davis, Brit. Med. Journ., March, 1884.	.....	Impaction.	Reduced with difficulty. Vomiting ceased on raising uterus. Delivery at term.
23	Henry F. Campbell, Am. Gyn. Trans., 1885	2 months.	Incarceration.	Genu-pectoral position and pushing up uterus. Cure.
24	Grailey Hewitt, Private Case Book.	3d month.	Incarceration.	Immediate relief on pushing up uterus. Recurrence of displacement with return of sickness. Again relief by some means. Use of ball pessary. Periodic replacement later. Delivery full term.
25	Doe, Boston Med. and Surg. Journ., Feb. 1886.	3 months.	Impaction.	Reduction most painful, but possible. Displacement recurs directly finger withdrawn. Treatment by packing of vagina. Cure. Delivery full term. (In a former pregnancy vomiting had been cured by accidental raising of the fundus.)
26	Clarke, Journ. Am. Med. Assoc., May, 1885.	?	.....	Artificial abortion. Recovery.
27	Véatch, Peoria Medical Monthly, 1884 and '85.	4th month.	Incarceration.	Patient refused replacement. Cauterization. Natural abortion. Death.
28	De Voe, Amer. Journ Obstet., Aug. 1884.	3 months.	Detention.	Manual replacement gave complete relief. Partial relief from other measures previously.
29	William Duncan, Lancet, 1887, ii. p. 754.	2d month.	.....	Cocaine applied to os and cervical canal. Cure.
30	William Duncan, Ibid.	3d month.	....	Cocaine applied to os and cervical canal. Cure.

Case VIII.—Patient aged twenty-three. Two months and a half pregnant. Constant vomiting for six weeks. *Uterus somewhat anteflexed.* Same application made, but not inside cervix. No vomiting for four days, then recurrence, but less severe. Second application, within cervix also. No more vomiting.

Cases of anteflexion or anteversion of the gravid uterus present greater difficulty in their analysis than those in which the uterus is displaced backward, and this is the class of cases which most requires elucidation.

In a former paper on the subject of severe vomiting in pregnancy cases of retroflexion and anteflexion were placed together, which was a fault, for it is obviously necessary to separate them, as I have now done each set of cases requiring separate consideration.

I have arranged these thirty cases in a tabular form in chronological order (Table III.), setting forth the time at which the vomiting became severe, the state of the uterus as regards fixation or mobility in its anteverted or anteflexed shape, and the treatment with the results thereof. This table, therefore, represents the frequency with which the anteflexed or anteverted gravid uterus was impacted, incarcerated, or detained in the pelvis in these thirty cases.

Table III. shows that in seventeen out of the thirty cases in which the uterus was anteverted or anteflexed *it was also* impacted or incarcerated in the pelvis. It is evident, also, from the facts related, that the cases in which such impaction or incarceration was present were the most serious of the cases mentioned, indicating unmistakably the importance of the presence of the impaction or incarceration as a factor in the cases in question.

The next category of cases are those in which there was severe vomiting associated with induration or thickening of the cervix uteri. In nine of these twelve cases the uterus was markedly anteflexed or anteverted, in the other three no note is given as to the position of the uterus. It appears very

probable that induration or thickening of the cervix would have been detected in a larger number of the cases analyzed had its presence been sought for.

TABLE IV.—SEVERE VOMITING IN PREGNANCY. INDURATION OR THICKENING OF THE CERVIX UTERI RECORDED AS BEING PRESENT.

Author.	Condition of os and cervix uteri.	Other particulars.
1. Grailey Hewitt.	Cervix very thick, dense, hard. Uterus had been much anteverted.	Had been much anteverted. See No. 10 Anteversion Series.
2. Horwitz.	Os somewhat thickened.	Uterus also anteverted and impacted. See No. 14 Anteversion Series,
3. Horwitz.	Cervix rather hard.	Uterus impacted. Se also No. 15 Anteversion Series.
4. Horwitz.	Cervix much thickened and lengthened.	Uterus anteverted and impacted. See No. 16 Anteversion Series.
5. Horwitz.	Cervix much thickened, softish.	Uterus bent forward and to right. See No. 18 Anteversion Series.
6. Horwitz.	Cervix rather hard.	Decided anteflexion. See No. 19 Anteversion Series.
7. Haslett.	Os congested, considerably enlarged, tender.	Anteflexion irreducible. See No. 21 Anteversion Series.
8. Henry Bennet, Inflammation of Uterus, 4th ed., p. 175.	Cervix voluminous, indurated, especially anterior lip.	Induration disappeared as uterus rose. See former paper, Table II.
9. Copeman, Brit. Med. Journ., Nov. 1875.	Posterior lip hard, unyielding.	Dilatation effected; cure. (No mention of position of uterus.)
10. Dukes, British Med. Journ., Feb. 1878.	Tissues of os very hard and cartilaginous.	Dilatation. Cure. (No mention as to position of uterus.)
11. Fry, Brit. Med. Journ., March, 1880.	Cervix hard, gristly.	Dilatation. Effect immediate. (No mention of position of uterus.)
12. Doe.	Cervix firm, unyielding.	Marked anteversion. See No. 25 Anteversion Series.

The cases in which there was observed severe vomiting in pregnancy associated with presence of inflammatory effusions adjacent to the uterus, are next to be considered.

TABLE V.—SEVERE VOMITING; UTERUS GRAVID, ANTEFLEXED; INFLAMMATORY CELLULITIC TUMOR PRESENT, ETC.

Author.	Condition of uterus, etc.	Treatment and results.
Horwitz (3d in his series), Zts. f. Geb. und Gyn., 1883.	Uterus size of four months, perimetric exudation rather firm, left side, uterus immovable, very sensitive. Cervix far back to left, difficult to reach.	Leeches, hot douche, mercury, nutritive enemata. Sickness less after some days. Delivered at term.
Horwitz (6th in his series).	Uterus much enlarged, right antero-lateral version. Irregular tumor felt to left side behind uterus.	Thought to be extra-uterine. Laparotomy by another practitioner. Death. Tumor cellulitis

The cases here included are limited to those in which a localized effusion was present; of which there are only two. The position and shape may, of course, have been effected by the presence of such tumors, and although the uterus was displaced, I have put them in a class by themselves.

The next class of cases are those in which there was severe vomiting associated with inflammation of the walls or the lining of the gravid uterus, endometritis, etc.

TABLE VI.—SEVERE VOMITING IN PREGNANCY. INFLAMMATION OF WALLS OR LINING OF GRAVID UTERUS, ENDOMETRITIS, ETC.

Author.	State of uterus, etc. Treatment.	Results.
Chomel, from Anquetin	Pus on decidua (autopsy).	Death.
Dance, Rep. Gén. d'Anat. and Phys., t. iii, p. 70	Pus between decidua and placenta (autopsy).	Death.
Dance, Ibid.	Uterus congested. Walls thin (autopsy).	Death.
Jaggard, Amer. Journ. Obstet., 1888.	Frequent losses of blood in this and also in former pregnancies. At five months severe sickness. After a week's ineffectual treatment abortion induced. Decidua unusually hypertrophied; considered to be a case of endometritis gravidarum. Vomiting began first sixteenth to eighteenth week, after fundus has risen into abdominal cavity.	Cure.
Gooch, Brit. Med. Journ., Sept. 1878.	Dilatation by finger, separation of membranes round os. Escape of much offensive discharge. Vomiting relieved. Delivery full term.	Cure.

The five cases here mentioned exhibit the association of inflammatory action within the uterus with severe vomiting. It may be surmised that the undue distention of the uterus was the cause of the vomiting in these cases.

It results from the analysis of the cases which have been tabulated, that certain conditions of the gravid uterus present themselves in association with the severe vomiting of pregnancy with frequency sufficient to lead to the suspicion that there is necessarily a connection of cause and effect between them. Impaction, incarceration, or detention of a retroflexed or anteflexed gravid uterus in the bony pelvis, stands out beyond all other abnormal conditions as associated with the severe, and, as it has been termed, the uncontrollable vomiting of pregnancy. The next abnormal condition in order of frequency appears to be induration and thickening of the os and cervix, and it is worthy of note that the conditions, flexion, incarceration of the uterus, and induration of the cervix, are not seldom associated.

The question as to impaction, incarceration, or detention of the gravid uterus in cases of severe vomiting requires a further consideration, so also the question as to the altered conditions, induration and thickening of the cervix.

Impaction or Incarceration of the Gravid Uterus, together with Retroversion or Anteversion and Flexion.

1. *Incarceration with Retroflexion of Gravid Uterus.*

As regards the possibility of incarceration of the gravid retroverted or retroflexed uterus, there is probably a very complete unanimity of opinion. That the retroflexed gravid uterus may become impacted to such a degree that it may be found very difficult or even impossible to liberate it from the pelvis is known. The difficulty is greater or less in different cases. In some cases women have died unrelieved; in some,

in spite of relief of the impaction, where too late effected; in some the fatal result has been due to destructive sloughing of the bladder, resulting from the severe, long-continued compression. Only recently a case was reported in which the uterus was excised, it being found impossible to reduce the impacted fundus or relieve the patient, on account of the presence of adhesions too strong to be overcome by manipulation. The impaction in *retroflexion* of the gravid uterus is favored by the shape of the pelvic cavity; the fundus expanding in its retroflexed shape, gradually fills up the hollow of the sacral bones, and thus the continued growth of the organ maintains and increases its backward inclination. The tilting becomes greater, and the os uteri rises up anteriorly so as to be sometimes found above the top of the pubic symphysis. Other results follow—retention of urine and various serious symptoms. Severe sickness occurs in some of these cases of impacted retroversion, but in the larger number of such it is absent. In cases in which severe vomiting does occur in association with retroflexion of the gravid uterus, as will be seen on referring to cases I have published, the relief to the vomiting on rectifying the position of the uterus is most marked and striking.

In eleven cases which I have been able to collect, this association of severe vomiting with marked retroflexion of the gravid uterus was observed. In some of the eleven cases the uterus was impacted in the pelvis in this retroflexed position, but in others there was a certain freedom of motion, the condition being one of incarceration without impaction.

The fact that retroflexion of the gravid uterus does not always occasion severe sickness naturally admits of the criticism that this is incompatible with the idea that in the eleven cases above alluded to the retroflexion was responsible for the sickness. In reply to this, we must look at the facts. As regards these eleven cases, the result of treatment showed that the sickness was relieved or cured in all the cases in which the malposition of the uterus was or could be rectified. In one case there is no report as to treatment at all, so we cannot

include it in the latter observation. A further explanatory remark must be made. In the non-gravid uterus retroflexion of the organ is sometimes accompanied by very severe sickness; indeed, I have had cases under my care in which life was threatened, and I have published the reports of such cases. But in the majority of cases of retroflexion of the non-gravid uterus there is no such vomiting. Here, then, we have a parallelism between the two classes of cases, and it is evident that retroflexion is liable, but not frequently, to be accompanied by severe sickness in the non-gravid and in the gravid state. Further remarks on this parallelism will be made later on.

In cases of incarceration of the retroflexed gravid uterus there can be little doubt that the cause of the incarceration is the flexed shape of the uterus. Formerly, as I need hardly remind my hearers, it was supposed that the displacement occurred after pregnancy had begun; but Tyler Smith has the merit of having pointed out that the retroversion or flexion generally, though not perhaps invariably, precedes the pregnancy, and the difficulty arises because the displaced or flexed uterus increases in size without losing its abnormal shape. The abnormal shape it is which leads, therefore, to the incarceration of the uterus in the pelvis. The remarkable success which attends replacing of the uterus in cases of retroflexion in removing the gravid vomiting, sufficiently shows that although retroflexion may not always cause vomiting, it seems always possible thus to cure vomiting *when* associated with the displacement in question.

2. *Incarceration or Impaction in Cases of Anteflexion of Gravid Uterus.*

The question as to the possible occurrence of incarceration in cases in which the gravid uterus is *anteflexed*, will next be considered. It has been questioned whether it is actually possible for this to occur. Against the idea it is urged that the pubic bones do not project over the cavity of the pelvis as

the sacral promontory does, and that there is, therefore, nothing to produce incarceration or to hinder the fundus uteri rising up into the abdomen, as it grows and expands during the third and fourth months of gestation. Hence, it is argued, impaction and incarceration of the anteflexed or anteverted gravid uterus in the pelvis cannot be recognized.

This is a question which can only be dealt with by facts; to facts we must appeal in order to satisfy those who affirm that "they cannot understand that the uterus can ever be incarcerated in the anteflexion or anteversion of early pregnancy."

In seventeen cases which I have tabulated, the uterus was found in a condition of more or less complete incarceration, the uterus in the gravid condition being anteverted or flexed, and the patient suffering from severe sickness, which in some of the cases actually proved fatal.

The seventeen cases of anteflexion or anteversion associated with impaction or detention of the uterus in the pelvis as a whole offer a body of facts which effectively answer the question, Is incarceration in the pelvis of the gravid anteverted or anteflexed uterus possible?

How is the incarceration to be explained? It appears to be chiefly due to the tenacity and rigidity of the cervical tissues, which prevent the uterus unfolding as regards the flexion, which we assume present from the first, and of which fact there is abundant clinical evidence. The uterus becomes, however, daily larger and larger, and the body fails to rise toward the brim of the pelvis because of the rigidity of the structures, and in some cases because of actual serous effusion in the tissues around the cervix, by which the body is held down as in a bed of plaster of Paris. I know of one case in which extensive serous infiltration was undoubtedly present. It thus becomes incarcerated, and probably in some cases the hardening of the lymph effusion around the cervix leads to a condition such as that described in Horwitz's cases No. 3 and No. 10. In these two cases it is stated that inflammatory effusions were found at the side of the uterus.

Incarceration or impaction of the gravid uterus anteflexed arises usually, I believe, from the fact that the uterus is in a state of more or less rigid anteflexion to begin with; it may be that in some cases it is tied down in an anteflexed shape by adhesions. Clinical evidence strongly supports the view that anteflexion pure and simple is the most common cause; but for it to have a decided effect in leading to impaction, it is probably necessary that the uterus should be rigidly set in a condition of anteflexion, otherwise natural expansion and elevation will occur, and there it will be no impaction or incarceration. There are a large number of cases of anteflexion with a rigid uterus in which, as is well known, sterility is the rule; but in a few such cases pregnancy happens, and there are strong reasons for the belief that it is precisely in such cases that, when pregnancy occurs, the anteflexion causes impaction followed by the advent of severe vomiting. The rigidity perpetuates the flexion as the uterus increases in size and becomes more and more distended by the growth of the ovum.

What Happens as Regards Elevation of the Uterus in Normal Cases?

The normal uterus undergoing the process of pregnancy expansion, enlarges in all directions, and at about two months and a half assumes a form almost completely spherical, anteriorly presenting to the vaginal touch a rounded elastic outline, but there is enough of mobility to admit of its being pushed upward to a slight extent. If somewhat anteverted before pregnancy begins, it retains this anteversion, but the natural tendency of the body of the uterus, as a whole, is to rise up in the direction of the brim axis. The movement upward appears to be more rapid in some cases than others. The tendency is, however, for it to rise until the greater part of the body of the uterus passes through the brim. In cases

in which the uterus is much anteverted or anteflexed, the movement upward is not so free. In the large majority of cases, however, sooner or later, and in a few cases much later than normal, the uterus succeeds in relieving itself from a somewhat embarrassed position, and the necessary room for further expansion is afforded by liberation from the pelvic cavity. Such escape and relief take place, as I understand it, in most cases; but in a few the state of the uterus itself offers resistance to the upward movement and expansion. In other words, incarceration of the gravid uterus in the pelvis occurs, and we have then before us cases in which the greatest difficulty is found in pushing up the fundus uteri from its depressed position, clinical evidence of which incarceration exists in the details of the cases above related. There are various degrees of the abnormal fixation present in different cases. In some there is actual impaction, in others a slight mobility exists, which may be termed cases of incarceration, while in a third set of cases the uterus is movable and easily pushed upward, although it may fall back into malposition immediately the pressure is withdrawn. These latter may be termed cases of detention only.

In support of the views above expressed, I would refer to a very valuable article "On the Effects of Antedisplacements of the Uterus on Pregnancy and Labor," by Dr. E. C. Gehrung, of St Louis, published in 1882, an article to which I referred in my former paper. Dr. Gehrung has evidently realized the difficulty which the anterior wall of the uterus experiences in its expansion in cases of gravid anteflexed uterus, the deficiency of elongation of the anterior wall, coupled with continued expansion of the uterus, producing, as he explains, a fixation of the fundus in an abnormal position against the pubes, while a part of the posterior wall is pushed upward and made to act as a pseudo-fundus.

I would also refer to the fact that in a very interesting essay entitled "The Genu-pectoral Posture; its Value in Improved Uterine Reduction and in the Prolonged Nausea

and Vomiting of Pregnancy,"[1] Dr. Henry F. Campbell, of Augusta, Georgia, has made a most important contribution to the knowledge and treatment of the condition now under discussion. The particulars given in the six cases which he relates in this essay as to the effect of the genu-pectoral posture in reducing the retroverted gravid uterus, and as to its effect also in reducing impaction of the anteverted gravid uterus, constitute most valuable evidence as to the nature and cause of the excessive vomiting of pregnancy. Four of his cases were cases of retroversion of the gravid uterus; two were instances of anteversion of the gravid uterus. Five of his cases were very severe in character, the sixth less so. Immediate relief as regards the sickness followed replacement of the uterus by the genu-pectoral posture, aided in some instances by pressure upward.

Presence of Rigidity of the Cervix and Internal Os Uteri as a Factor in the Production of Severe Vomiting during Pregnancy.

Presence of rigidity of the cervix, whether alone or associated with incarceration of the uterus, seems to be a very important factor in the production of vomiting. I have in Table IV. arranged cases of this kind. The observation made by Dr. Copemań in 1875 and confirmed by various observers since, as to the beneficial effects in many cases of dilating the cervix and the os interum in arresting the vomiting, which observations I quoted in my former paper, have very great interest. Dr. Copeman hit upon this idea quite accidentally, his object having been in the first case in which he tried it to bring about abortion. The mere dilatation of the cervix with the finger, however, arrested the vomiting, and the abortion was not required; and afterward he employed the procedure curatively and with success in several instances. He did not profess to explain the *modus operandi* of the cure. Looking at the facts collected since, it would appear that the

[1] American Gynecological Transactions, 1885.

manœuvre is successful, because it liberates from pressure or tension tissues around the internal os. This relief appears to have been effected sometimes by the forcible stretching of the canal of the cervix and sometimes by the accidental setting free of an incarceration of the uterus. Sometimes a slight force is capable, as cases reported show, of liberating an anteflexed incarcerated uterus. In his second case, Dr. Copeman found the uterus anteverted so as to allow the head to be felt below the level of the os uteri. He raised the body of the uterus by gentle pressure out of the pelvis, and the vomiting at once disappeared. In this case no dilatation was performed, yet the patient was cured; and in some other cases that have been mentioned, in which dilatation was employed, it is probable that unwittingly the uterus has been tilted and an impaction relieved where the benefit was erroneously attributed to the dilatation.

The indurated state of the tissues round the internal os is usually indicated by the unusually hardened, or thickened condition of the external os, which is the more striking, as in cases of healthy pregnancy the os becomes softer than usual. Chronic induration of the cervix, whether we regard it as an effect or an accidental contemporary occurrence, with change of shape of the uterus, probably constitutes a very important factor in the etiology of pregnancy vomiting. In one of two cases I have related, in which the uterus had been successfully treated for displacement, the cervical induration remaining behind appeared to excite the vomiting observed.

Rigidity of the tissues around the internal os must, it need hardly be stated, interfere with the unfolding of the anteflexion, and offers, therefore, a resistance to the normal elevation of the uterus.

In the annexed Table VII. an attempt is made to show how far the patients suffering from severe vomiting in pregnancy were relieved by measures of treatment adapted to the removal of the impaction; how far, in fact, the suffering was mitigated by efforts made to place the uterus in a more normal condition, not only as regards its position, but also its shape.

TABLE VII. — RESULTS OF TREATMENT DIRECTED TO THE REMOVAL OF IMPACTION, INCARCERATION, OR DETENTION OF UTERUS IN RELIEVING THE VOMITING.

CASES OF RETROFLEXION.

Impaction or incarceration. Reduction not possible or not attempted.

Case 1. Suspension of sickness on reduction. Reduction could not be maintained. Death.
" 6. Treatment not stated.

Impaction. Reduction effected.

Case 2. Cure.
" 3. Cure. Recurrence of sickness. Cure a second and third time; finally abortion at six months.
" 4. Cure by rest and position.
" 5. Cure by Hodge pessary.
" 7. Cure.
" 8. }
" 9. } Cure by manipulation, and genu-pectoral position.
" 10. }
" 11. }

CASES OF ANTEFLEXION AND ANTEVERSION.

Impaction. Reduction not possible, or not maintained, or not attempted.

Case 1. Death.
" 2. Death.
" 4. Induced abortion. Recovery.
" 14. Abortion following use of tampons. Recovery.
" 15. Death.
" 16. Induced abortion. Death.
" 17. Induced abortion. Recovery.
" 19. Induced abortion. Slow recovery.
" 20. Induced abortion. Death.
" 21. Induced abortion. Recovery.
" 27. Abortion. Death.

Impaction. Reduction effected.

Case 10. Rest. Horizontal position. Relief. Miscarriage at seven months.
" 13. Rest. Natural care.
" 22. Cure by manipulative reduction and use of pessary.
" 23. Cure by manipulative reduction.
" 24. Cure by manipulative reduction.
" 25. Cure by manipulative reduction and packing vagina.

Detention only.

Case 3. Natural elevation. Cure.
" 6. Natural elevation. Cure.
" 8. Manual elevation. Cure.
" 9. Manual elevation. Cure. Slight dilatation day after.
" 28. Manual elevation. Cure. (In this case other treatment previously employed.)

RESULTS OF DILATATION OF CERVIX (COPEMAN'S) IN RELIEVING VOMITING.

In 12 cases, 4 of which by Copeman, 8 by various operators, the vomiting was cured. In a few of these 12 cases the cervix was indurated. In none of them is position of uterus stated. (See former paper.)

In G. Hewitt's case, relief of vomiting, but death a few days later See Case 11, Anteversion Series. In 2 cases, by Horwitz, effect slight but not permanent.

The following is a brief *résumé* of the effects of reducing the malposition, and thus altering the shape of the uterus, in eleven cases of *retroflexion or retroversion.* In one sickness was suspended for a time; uterus could not be maintained in position; death. In one case, treatment not known. Of the nine cases, in which the uterus was reduced, a cure followed in every case. In one of these the cure was effected three times, the uterus being difficult to keep in position, and the patient restless under the treatment.

In seventeen cases of *anteversion or anteflexion* with impaction. In eleven of these cases impaction was not removed, and in three of these death occurred. In six of the eleven abortion was induced, and two died while four recovered. In two of the twelve natural abortion occurred; one lived, one died.

In six cases of anteversion or anteflexion with impaction, reduction was effected by manual effort in four cases, and by rest, etc., in two cases; all the six were cured.

There were five cases of anteversion or flexion with detention of the uterus in the pelvis only. Of these, manipulative reduction was effected in three cases, and in the two others natural elevation occurred. Cure in all these five cases; there were eight other cases of anteversion or flexion. Cases V., VII., XI., XII., XVIII., XXVI., XXIX., XXX., which for various reasons have not been classified in the above categories.

Vomiting of Pregnancy a Reflex Act.

The vomiting of pregnancy is generally assumed to be a reflex act.

This implies consensuous action of three elements :

1. The irritating agent. 2. The nerve centre, the irritation-receiving organ. 3. The muscular action constituting the act of vomiting.

It is rational to suppose that, as regards Nos. 1 and 2, there may be variations from the normal condition, which may affect one or the other exclusively. Thus we may suppose that in one case the element No. 1 is principally at fault, while in another the element No. 2 is chiefly responsible ; or, in other words, supposing the irritation (excentric) in two given cases to be equal, the vomiting occurs in one case because the central system is unduly excitable, while it fails to do so in the other case on account of the central system being in a normal, not easily excitable condition. The opposite kind of combination is obviously also possible. The greatest degree of vomiting would, of course, be expected to occur in those cases in which the elements 1 and 2 are both in an exaggerated *plus* state, and there is not only greater excentric irritation, but an increased central excitability.

The reflex theory of pregnancy vomiting almost necessarily implies admission that the uterus, or some part of it, is the starting-point—the element No. 1, the locality of the excentric irritation, and the reflex theory of the severe vomiting of pregnancy, assumes that there is no essential difference between the ordinary vomiting of pregnancy and the severe or so-called uncontrollable form of the affection.

Most of those who look upon the uterus as playing the part of the irritating agent, connect the irritation with the expansion this organ undergoes during pregnancy, and the consequent action upon the uterine nerves. Some, as Dr. Barnes, attribute the irritation to undue tension of the muscular structure of the uterus ; others consider that it is due

to direct pressure upon the nerves, produced by compression acting either generally or particularly at certain situations. It appears to me that the probabilities are very strongly in favor of the idea that the nerves in the neighborhood of the internal os uteri are the nerves which are primarily irritated, and that this occurs because of the tissue-compression liable to happen at that situation in the way previously described. That compression is present in a great number of instances is evident on looking over the cases, in which we find note of induration, thickening, incarceration, undue flexion, etc., at or near this region of the uterus. That remedies, whether sedative by application of drugs or mechanical treatment, so acting as to liberate from compression the tissues at this situation, are very frequently effectual, can only be explained by supposing that the irritated nerves are quieted by the drug, as in the cases I have quoted by Dr. William Duncan, or that the irritation is made to cease on the removal of pressure.

It is important, here again, to note that compression may be present in the cervical tissues without either displacement or incarceration, or even flexion. In one very severe case which I reported in my former paper the patient had been so far cured of a chronic anteflexion that pregnancy occurred, but the cervix was thick and rigid, and remained so. When pregnancy set in severe vomiting occurred. All remedies being ineffectual, it was resolved to adopt Copeman's method—forcible dilatation of the cervix. Now, in carrying out this treatment the cervix was found to be so rigid that it took some four hours to effect so much dilatation as to allow of the introduction of the forefinger, and the tissues of the cervix were so rigid as to imply, necessarily, compression of the nervous filaments of the uterus at this situation.

In this case the chronic congestive hypertrophy of the cervix was apparently due to the flexion. This passed into a state of great rigidity; pregnancy occurring, expansion of the cervix was hindered and obstructed by the hardened tissues, and nerve compression followed with the further grave symp-

tom—severe vomiting. This, at least, is the interpretation of the case suggested at the time. The thickness and density of the cervical tissues doubtless vary in different cases, but this was an extreme instance. In several cases related by Copeman and others who have followed his practice, the rigidity of the cervix has not usually been very great, the cervix allowing the forefinger to be introduced without great effort, while in others it was much greater; but it seems probable that a slight area of rigidity and resistance may produce considerable effects in the way of production of reflex vomiting.

If, as appears, we are quite justified in so doing, we regard the ordinary vomiting of pregnancy and the severe vomiting as mere gradations of one and the same condition, it is easy to understand why the tension and compression of nerve filaments in the expanding tissues of the cervix should be slight in the large majority of cases; why, indeed, there should be none at all in some cases (in which there is no vomiting at any time observed); and why it should be severe and intractable in those cases in which tension and compression of nerve filaments are very great and well marked.

The relief which patients affected with ordinary pregnancy vomiting so commonly experience at about the end of the fourth month, is readily explicable on the theory that it is brought about by the elevation of the fundus and its escape from the pelvis, and that it results from the cessation of compression of cervical nerves which follows the straightening out of the uterus implied in this escape of the uterine body from its confined position.

Parallelism between Cases of Uterine Vomiting in the Non-pregnant State and Severe Vomiting in Pregnancy.

In certain cases, patients suffering from chronic uterine flexions present in the non-pregnant condition symptoms of a very severe character—obstinate, sometimes uncontrollable and dangerous sickness. In clinical lectures on the "Uterine

Neuroses," published in 1886,[1] I gave particulars of nineteen cases which had come under my notice, associated with presence of marked degrees of uterine flexion. Some of the patients were so ill that life had been despaired of, and extreme emaciation was produced by the incessant vomiting. The sickness was, however, found to be controllable and curable by treatment of the uterine displacement and flexion. They were cases of "uterine" sickness, there being, of course, no suspicion of gravidity in any one of them, the majority being unmarried.

The explanation of the sickness present in these nineteen cases may possibly be disputed in one or two of them, but the history of the cases and the results of the treatment appear to justify completely the conclusion arrived at respecting them, that they were cases of uterine vomiting. These cases show that chronic flexions of the uterus may be associated with severe and even dangerous vomiting.

In cases of chronic flexion of the uterus, various abnormal conditions are present. Two prominent conditions usually observed are: 1. *Alteration of the shape of the cervix uteri;* 2. *More or less induration and condensation of the tissues of the cervix*, especially in the part contiguous to the internal os uteri. This induration is not always present, but it is so very frequently, and microscopic investigations show the presence of what has been termed "sclerosis" of the tissues[2] in the indu-

[1] British Medical Journal, June and July, 1886.

[2] The prominent lesions in the body or in the cervix in metritis are, in parous women, according to Jacobi (Amer. Journ. Obstet., 1884), enlargement and multiplication of blood-vessels, dilatations of lymphatics, proliferation of a scantily nucleated cellular connective tissue chiefly around both sets of nutrient canals, also occasional infiltration of parenchyma. Jacobi figures, p. 826, Figs. 15 and 16, a patch of sclerosis, the section being taken from the parenchyma underneath the peritoneum exactly at the inferior angle of flexion in a case of retroflexion. This peri-vascular sclerosis, it is suggested, arises from nutritive exudation of an albuminous plasma, gradually causing a local development of connective tissue. Jacobi's microscopic observation was made in parous subjects; but, as this author states, it is possible that peri-vascular sclerosis exists in the cervix of sterile married women, and the observations mentioned of the behavior of the anteflexed rigid uterus are strikingly confirmatory of this view.

rated parts affected around the internal os uteri. The result is that the healthy expansibility and elasticity of the structures in the part of the uterus so affected must be expected to be more or less lost. This condition of the cervical canal is so marked in many cases that in order to straighten the canal a considerable effort may be required, and in such cases when the sound is withdrawn the uterus rapidly assumes again its vicious shape: the flexion returns.

That rigidity, condensation, and want of expansibility of the tissues situated around and near the internal os uteri, offer an obstacle to the healthy expansion of the uterus when pregnancy occurs, appears extremely probable from the results of actual observation of cases. We thus encounter in the state of the walls of the cervical canal a physical condition which is appreciable and distinctly calculated to present a difficulty in the process of uterine expansion. When pregnancy occurs, there at once happens a notable change in the tissues of the uterus: every part of the organ becomes swollen and increased in bulk, the bloodvessels increase notably in size, the cavity of the body of the uterus rapidly assumes an almost spherical shape, which implies certainly diffusion and extension of the structures around the internal os uteri as well as at other situations. As a result of the increase in dimension of the bloodvessels there is an increase of pressure on the parts between the bloodvessels. This increase of pressure has no bad result in cases in which the tissues present no undue resistance to such increase in size. But it is inevitable that a mischievous degree of interference with proper growth may occur if the tissues at this situation are rigid and do not easily permit expansion. Sclerotic effusions around and between the bloodvessels offer resistance of this kind, resistance which will be increased by whatever tends to hinder the general globe-like swelling of the uterine body.

In a case in which the uterus is flexed at the beginning of the pregnancy and the flexion is pronounced, the tissues of the cervix being rigid and the uterus as a whole low down in the

pelvis, and in a condition of quasi-fixation, the degree of compression at the situation of the bend will be greater. No doubt, there are many cases of flexion in which pregnancy occurs and in which the uterus slowly expands, overcoming the rigidity at the os internum and its neighborhood, in which, in spite of somewhat adverse circumstances, the uterus gets rid of its bent shape and the fundus rises up out of the pelvis. But when the difficulty in this way is very great, the fundus of the uterus fails to rise as it should do, and inasmuch as the uterus is all the time becoming more and more bulky, it happens that the organ is unable to straighten itself, inasmuch as it appears to be too tightly packed in the pelvis to do so, by its unaided efforts at least, When the uterus has become thus incarcerated in the pelvis, difficulties of all kinds are increased and the degree of compression at the seat of the bend of the uterus becomes greater. Thus it is that the rigidity of cervical tissues associated with and probably originated in most cases by the flexion of the uterus, interferes with healthy expansion during pregnancy, and that in some extreme cases the expansion and swelling of the uterus act in such a way as actually to hinder and prevent further proper expansion by giving rise to incarceration.

It has been urged that because the uterus is, as a rule, in a state of slight anteflexion or version, this cannot be accepted as a cause of severe vomiting. Are not, it is said, many women the subjects of anteflexion and version, yet how few have severe pregnancy vomiting? This is the gist of an argument which I have already dealt with. The answer to this will be found, as I believe, in a careful inquiry into the actual state of the cervix in different cases. If the uterine tissues possess their normal expansibility, the presence of slight anteflexion or version will be no absolute hindrance to regular pregnancy-expansion. There will probably be some sickness, but nothing beyond what may be called "normal." If, on the other hand, the organ be flexed or verted and *hardened* in that state, the flexion or version will or may materially inter-

fere with pregnancy-expansion. This is the fundamental explanation of the apparent anomaly. How and why rigidity and hardening occur, I have already explained.

Other Symptoms indicative of Uterine Irritation in Cases of Severe Vomiting.

There are few cases of severe vomiting in which other symptoms of a very important character are absent—symptoms which indicate an abnormal condition of the uterus or of organs in close contiguity to the cervix. One of these is *pain*, pain felt low down in the pelvis often of a severe character, though not always severe, yet generally present. The pain is usually more to one side, referred to the region of the foramen ovale. In two recent cases this pain was very marked and I carefully observed its course and history. It was found to be relieved by raising the fundus or helping it to rise out of the pelvis, and was plainly due to the condition causing the incarceration. Another symptom is *tenderness to the touch* on vaginal examination. This tenderness is located, as I have observed it, on the side where the pain happens to be. It is also indicative of incarceration of the uterus or of a condition approaching incarceration, and it may be found associated with an œdematous feel in the vaginal roof, usually more or less to one side. Another symptom often associated with the pain and tenderness is a sensation of compression or pressure. One patient had a feeling as if some one were sitting on her. It is due to incarceration or to a condition approaching incarceration, and is plainly due to the resistance offered to elevation and expansion of the uterus. This is proved by the effect which gentle upward pressure through the vaginal roof has in relieving the patient.

Another symptom often present in association with severe vomiting is frequency of micturition. In cases of anteversion or flexion there is usually this frequency of micturition.

The foregoing symptoms are more particularly observed in cases of severe vomiting and anterior displacement. In cases

of vomiting with retro-displacement, the disturbance of micturition is generally of another kind, the patient experiences a difficulty, and retention of urine, as is well known, is very liable to occur and, indeed, constitutes one of the grave incidents of this particular disease.

The analysis of the cases which have been given appears to offer strong reasons for the conclusions which have been submitted as to the altered conditions of the uterus being the cause of the vomiting, the number of cases in which the conjunction of impaction or incarceration with uterine displacement and seriously severe vomiting was observed is too great for it to have been a mere coincidence. The greater severity of symptoms, moreover, coincided, as a rule, with the greatest degree of impaction. Very striking also are the facts in regard to the efficacy of manipulative reduction, when that was possible, in relieving the patient from the vomiting; also the continuance of the symptoms in cases in which reduction was not possible or was not attempted.

Apart from the evidence of these cases, what is known of the history of pregnancy-vomiting favors the hypothesis here sustained. The parallelism between severe vomiting in cases of uterine flexion in the gravid and non-gravid state; the relief obtained in many cases of gravid sickness by the simple adoption of the horizontal position; the "morning" sickness so often occurring in gravid cases on first rising from bed, an effect probably increased by its being contemporary with relief of the bladder; the fact that, as a rule, the sickness of gravidity so generally becomes modified or cured when the uterus rises into the abdomen a little before the middle of pregnancy, which is just what we should expect if the hypothesis be true. These facts in the history of pregnancy-sickness are certainly not in opposition to it.

The conclusion suggested is substantially in agreement with the opinion of Desormeaux, expressed some years ago, that the vomiting is due to interference with expansion of the uterus. The cases related in this paper appear to show that

there are two factors which principally contribute to this interference with uterine expansion. 1. Incarceration of the uterus in the pelvis associated with flexion or version; and 2. Undue hardness and rigidity of the tissues of the cervix and around the os internum. Also that these two factors are in most cases associated.

Treatment. — The main question as regards treatment concerns those cases in which the vomiting is so severe as apparently to imperil life, and in which ordinary measures have been unavailingly employed. The cases in question are, in fact, those in which the *dernier ressort*—induction of abortion —is the only alternative. This operation, itself not devoid of danger, would naturally be avoided if possible. The clinical facts above related support the view that an effectual restoration of the body of the uterus to its proper position is usually needed in these cases, and that it will prove to be a real and substantial remedy for the severe vomiting of pregnancy.

Reposition of the uterus and relief of incarceration or detention of the uterus in the pelvis, may be effected as follows: In cases of *retroflexion* of the gravid uterus the genu-pectoral position, aided by pressure of the fingers from the vagina or rectum, is a well-known method of effecting reposition. The use of a well-selected and adapted Hodge pessary, covered by a soft material, is of great assistance in maintaining the uterus in place after reduction.

In cases of *gravid anteflexion* with impaction, the patient must be kept in the dorsal position. By means of one or two fingers gentle pressure should be made through the vaginal roof, the pressure being continuous but not severe and the points of the fingers kept well against the symphysis pubis. Some minutes spent thus, the effort is usually followed by a certain degree of dislodgement of the uterus. This process may be repeated after a few hours. Great care should be taken to manipulate antiseptically. In some cases a quite round air-ball India-rubber pessary acts very usefully at this

juncture. Care should be taken not to inflate the pessary too much. One inch and three-quarters to two inches in diameter is amply sufficient. The pessary may be used for eight or ten hours and then removed. Subsequently further manipulative treatment of the same kind will probably not be required. The use of the fingers appears to me safer and more manageable as regards its effects than the employment of tampons. The patient must remain absolutely quiescent for some days. A soft covered cradle pessary is sometimes required. The elevation of the uterus, as above described, has the advantage that it is not a dangerous procedure.

Supposing the sickness and vomiting to be unaffected by the above treatment, the treatment known as *Copeman's dilatation*, consisting in dilatation of the cervix, including the internal os by means of the finger or by special dilators, may be tried. This treatment may possibly prove to be required in some cases in which the cervix is hypertrophied and indurated. How far it will prove necessary is not yet known, seeing that the reposition treatment has not yet been tried on a sufficiently extensive scale. Copeman's dilatation is a procedure which is liable to produce abortion, though it has not been found to have this effect so frequently as might have been anticipated. It seems probable that Copeman's dilatation is often successful because reposition of a displacement is accidentally brought about by the manipulation necessary.

Induction of abortion remains for employment when other measures fail. It may be difficult to decide in a given case as to its necessity; a practical point may be suggested as to help to decision *pro* or *con*. Prostration and vomiting are the two notable symptoms. So long as vomiting continues the malady may be considered to be untouched remedially. Mere prostration, however severe, should not, I would venture to suggest, be considered to be an indication for induction of abortion; the continuance of vomiting is more serious than the continuance of prostration.

General Treatment. — In both mild and severe cases the

most important part in the general treatment is to keep the patient altogether in bed. Removal of abdominal pressure by itself allows of a complete cure in many cases in which the sickness is not severe. The prone position aided by the genu-pectoral is suitable for retroflexion, the dorsal position for anteflexion. Sedatives are often successful (aided by rest, etc.) in allaying the vomiting, the drug being more efficacious when given by the rectum or vagina in suppository form. Cocaine has been found a good remedy by Dr. William Duncan. The effects of sedatives, particularly local ones, are sometimes very decided, even in severe cases; some link in the nervous chain which sets up the reflex vomiting is thus broken and the vomiting for the time arrested.

DISCUSSION.

Dr. A. J. C. Skene, of Brooklyn.—I am glad to have an opportunity of saying two or three words on this subject, not that I can add anything to it, but I wish to say that most of what I know about the diseases of the uterus and their influence upon the general organization, both of the pregnant and non-pregnant state, I have learned from the author of the paper, Dr. Grailey Hewitt, and I have obtained my most valuable information regarding puerperal affections, from Dr. Barker, who has just discussed the paper.[1] The teachings of these two gentlemen in the past I have found most valuable guides in practice, and their contributions at the present time to this subject are certainly of great value, and I am sure I shall profit by them. While Dr. Barker has just said that vomiting of pregnancy is largely a neurotic affection, yet it is claimed, and truly, that in the severe and dangerous forms of the trouble some abnormal state of the uterus is, no doubt, also present and acts as an important cause.

Bearing these facts in mind, and the methods of treatment suggusted by Dr. Grailey Hewitt, in his valuable paper, I have no doubt that the management of such cases can be most effectually

[1] The Reporter failed to understand the remarks made by Dr. Barker and they, consequently, cannot be reproduced.

carried out. I think the paper impresses the lesson which we have already learned, and that is, that we must make each case a special study by itself; and as the causes are so varied we must seek for the cause in each case and adapt our treatment accordingly. That we will be each more able to do so by the light of the paper now under discussion goes without saying.

Dr. W. Gill Wylie, of New York.—I do not mean to take up much time, but I will say a few words in favor of Copeman's method, slightly modified. I cannot say I look at it in the same way as Dr. Hewitt, but the method I have practised has been to dilate thoroughly up to the os.

I believe, with Dr. Barker, that a sensitive organization and the general condition have a great deal to do with nausea; but in the characteristic cases that I have seen I have found it nearly always due to induration or some disease of the os uteri, and that if we dilate that well it will cure in a majority of cases, but it must be very thoroughly done. Not long since, in New York, I was sent for by one of my colleagues to see a case in consultation, to produce abortion to arrest vomiting. He said he had done Copeman's method, and had repeated it. He considered he had done it thoroughly, but I did not consider it so. I then dilated the os with a steel dilator according to the method I have adopted, and the abortion was not necessary. I think you will find that almost all of the younger men in New York use that method, and I think that at least one-half of our cures are brought about by a thorough dilatation of the os uteri up to the os internum.

Now, when I have a case of nausea and vomiting in pregnancy, after excluding as well as I can any extraneous cause outside of the uterine trouble, I correct the condition of the bowels and dilate the os uteri, and I believe the reason the Copeman method is not more used to-day is because it has not been well done.

Dr. Hewitt.—I am very much obliged to the gentlemen for the terms in which they have expressed themselves in their criticism in reference to my paper.

So far as I can understand, there is no essential difference between the views I have expressed and those maintained by the gentlemen who have spoken on the subject, except the views of

Dr. Barker. I expressly stated in my paper, that no doubt there is a great difference in the different cases; in one woman we may expect to have sickness, whilst in another the condition of the uterus may be identical, and yet there will be no sickness at all. It depends upon the greater sensibility of the nerves of one than of another.

In regard to the subject of neurosis. There has been a good deal said on this subject; I think it is becoming rather the "fashion," if I may venture to express myself that way, to use the word in a manner which does not advance the science of medicine. It is only substituting another word for a term we have used before, and I do not know that it carries us any further than before. Supposing, however, that the use of it is admitted, what does it mean? I suppose it means that the nervous centres are more susceptible than usual. And why? I would venture to suggest, because they are in a weakened condition. These cases mostly originate in women who are weakly and feeble, in whom the nutritive process has been out of order for some time, and they are predisposed to become attacked with this disease when pregnancy occurs. If you mean neurotic, I agree with the use of the neurotic, but short of that I should be disposed to argue against it.

In reference to the cure of these cases of severe vomiting in pregnancy. In the case which Dr. Barker so graphically described, in which the lobster salad came into play, the patient had been kept under careful treatment before, kept quiet in bed in a horizontal position, and that alone would do a good deal to cure her; hence the position is important in these cases. But there are cases in which it is not enough to do this, cases in which the trouble is more severe, and in spite of the patient being kept in bed, and the abortion occurring, sickness exists, and the case comes to a point where we have got to do something. The cases I have brought forward were cases in which the condition was very grave, and the majority of them, cases in which there would have been a fatal result.

I have said very little on the treatment of these cases, not having had time for it. The great object we have in dealing with any medical subject is to arrive at the diagnosis; we know what the treatment should be in most instances when we have

arrived at our diagnosis. A diagnosis, as Dr. Meigs used to say, is very powerful; when we have a clear understanding of the case we are for the first time in a position to treat it.

There are many varieties of treatment; for instance, you may put the patient to bed, or in another case you may give opium or in still another case, in which these two fail, we may find it necessary to lift the uterus up out of the pelvis. My impression is that, in a great number of these cases, the uterus does require this little help; in many cases the patient never gets rid of this trouble.

I thank the gentlemen for their kind attention.

THE DANGERS OF GALVANO-PUNCTURE IN PELVIC TUMORS.

By Ely Van de Warker, M.D.,
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If anything were needed to prove that the medical profession observed natural events in a manner a long way below the standard fixed for the scientific observer not medical, it would be simply necessary to refer to the one-sided history that attends the record of a new medical method or a surgical procedure. We first know only the successful side of it. It comes in a wave of popularity and glory. The author of it comes before us in a flush of sudden fame like that of a champion oarsman or prima donna. It may be studied as you would a fever in an individual, or an epidemic in a community; there is a beginning, a sudden upward curve, an apex, a decline, and a rapid and final end. The matter has simply dropped out of sight, not that anything unfavorable has been said about it, but by common consent nothing is said of it, and the thing dies.

We know that an inductive science cannot be studied in this way. On the contrary, that it implies a simple record of facts, facts for and against, and that it in no degree matters what theory is advanced or what dogma is exploded, so long that the eternal truth lives and rules in its kingdom—the infinite dominion of the human mind. Scientifically speaking, a negative fact is of as much value as a positive one, and, if this is true of science in general, it is specially true of medicine in particular, dealing as it does with such uncertain factors and with agencies and qualities nearly always of such

conditional value. Throughout the field of medicine and surgery the negative fact is the one test of utility and the absolute measure of success.

I speak thus strongly upon the subject of galvano-puncture because I believe that we are not getting the negative facts concerning it upon record, and I feel that I have a special right to do this for the reason that I have faith in the electrolytic treatment of pelvic tumors; but the subject has not been handled in a manner becoming a scientific subject. Our attention has been diverted from a very important to one quite unimportant matter. In this electrical revival which has been confined to the field of operative gynecology, the mass of the literature has turned upon dosage by means of the milliampèremeter and the method of rendering the inoperative pole skin-inert. This is important, but no more so than is the dose of opium or of any other potent drug. Having reached this stage in the use of our agent, we begin using electrolysis in all forms of solid pelvic tumors, overlooking the possibility that there is a variety of these growths, not all of which might be electrolytes in the direction of cure. Now, I believe that there are fibroid pelvic neoplasms in which galvano-puncture or electrolysis in any form, no matter what the dose, ought not to be employed; and I feel certain that, had the negative side of the question been given the importance that it deserved, a point so vital as this would be now in a fair way of settlement, instead of being just in the dawn of recognition.

It is with a possible imputation that my experience may be made up largely of personal equation, or want of skill and fitness for the work, that I offer my contribution to the negative side of the subject of galvano-puncture of pelvic tumors. I am encouraged to do this because I find in the literature of the subject a record of experience that corresponds with my own. It is, however, almost a painful reflection upon the spirit that has pervaded the literature of electrolysis in our special field, when I state that among the special workers in this within

my personal knowledge I have learned of more accidents and failures than I have been able to find in the entire literature in my reach.

Case I.—Mrs. M., aged twenty-eight years, nullipara, was sent to me by Dr. Munn, of Wayne County. A firm, irregular mass filled the pelvis, displacing the uterus to the left and backward, and intimately incorporated with it, the cervix being obliterated and the os externum appearing as an opening in the vaginal expansion of the mass. On external palpation an extension of the growth, hard and firm, could be felt nearly on a level with the umbilicus upon the right. It shelved away in several minor prominences to the level of the crest of the ilium on the left. The uterus measured 4.5 inches. Menstruation was regular as to time, and appeared to but little affected by the presence of the growth. There was only slight pain complained of, and no abdominal tenderness. She had been married two years, and was not aware of the presence of the growth previous to that event. Owing to the youth of the patient, and the size and rapid increase of the tumor, it was very important to try some method of arresting the growth. At that time, 1885, but few of us were working with the precision that we are now in electrical matters, and the electrolysis of fibroids had not attained its present status in gynecological literature and practice; and matters that are now beyond controversy were then wholly within debatable ground. I accordingly practised a method that I now believe to be entirely unjustifiable and dangerous. I had received about that time, from the author, a reprint of Dr. Freeman's method, what we may call the bi-polar puncture—that is, two needles, each connected with its respective pole, are plunged into the tumor. I was not favorably impressed with the method at the time, but a medical friend who had witnessed some of the results of the operations of Dr. Freeman, visited me and induced me to give it a trial. The case of Mrs. M. was the first that presented itself of sufficient urgency to warrant some risk in its treatment. She was admitted to the Central New York Hospital for Women, and on June 12th, after being carefully prepared antiseptically, was operated on. The needles, carefully sterilized, were inserted into the base of the tumor through the abdominal wall, about five inches apart, and the current from fifteen zinc-carbon couplets

was gradually turned on. The action of the current was extremely painful, judging by the contortions of the patient while under complete anæsthesia. The *seance* lasted ten minutes. There was some abdominal tenderness, but it had disappeared by the 18th, on which date the second operation was made. On the 21st there was the first appearance of high temperature with tenderness over the abdomen at a point corresponding to the puncture of the negative needle. She had little or no pain. The temperature would range from 101° to 101.8° in the evening, to 99.5° to 100° in the morning, and twice during that time dropping to normal. Tenderness continued over the abdomen with the centre of disturbance at the point mentioned above. On palpation, a gradual softening and enlargement could be detected going on in this region. For three weeks there was no interruption to this history; she was becoming exhausted, and I was seriously alarmed. She was anxious to go home, and she left us a very sick woman. Dr. Munn attended her, and reported to me in person, some time after, that a large abscess had opened over the prominent part of the tumor and discharged large quantities of pus mixed with shreds, and pieces of membrane resembling the walls of a cyst came away. After this date recovery was quite rapid, while the tumor, in the opinion of Dr. Munn, was considerably diminished in size. Convinced of this, Mrs. M. was induced by her physician to make another trial of the treatment. She was re-admitted, and on September 16, 1885, electrolysis by the bi-polar galvano-puncture was again made, as I was anxious to clear up my doubts and give the method a fair trial. Again, on March 9, 1886, and on June 14th, the operations were repeated. There was no further febrile reaction following these operations, and but little abdominal tenderness, which passed off in a day or two. She called on me August 21, 1888, and gave me an opportunity to make the following measurements, which I here present, in comparison with those made nearly three years before:

	1885.	1888.
Left superior spinous process to umbilicus	7	6.5
Right superior spinous process to umbilicus	6.3	7
Girth	35.5	31
Umbilicus to pubes	8	9
Umbilicus to ensiform cartilage	8	7

Whether the tumor has become quiescent, or whether it was benefited by the electrical intervention, I leave for you to judge.

Case II.—Mrs. ——, aged forty-three years, the mother of two children, the youngest nine years old. There was the history of three abortions at long intervals between. For the last six years the menstrual periods had been gradually shortening, and while the actual loss each month did not seem to be materially increased, yet she was obliged to wear a napkin three weeks out of the four. She applied to me for examination in July, 1887. The cervix was found displaced to the right, and crowded close behind the pubes; the vaginal vault was occupied by a bulging solid mass, which seemed to fill the pelvis, and yet, as we often see, there was no difficulty in evacuating the bowels, or relieving vesical symptoms. Externally palpated, the mass could be felt just above the pubes, centrally, prolonged in irregular mass to the height of the anterior spinous process of ilium on the left. On the right, at about the normal situation of the umbilicus was a point tender on pressure, and the seat of a nearly constant pain, which was the cause of her seeking relief. Here also the tumor was evident to the touch on a level with the pelvic brim, dense and firmly fixed. This appeared to me a favorable instance for the galvano-puncture after the method of Apostoli. Accordingly, on July 15th, after being carefully prepared with antiseptic douches, negative galvano-puncture through the vagina was made at the office, a current of 150 milliampères being employed. She complained considerably of pain, but the operation was borne fairly well without an anæsthetic. About an hour after the operation she was sent home in a hack. Everything went well after this, she complained less of the pains in the right groin, while the discharge remained about the same. Three weeks passed, and I had not seen my patient for several days, when one morning I received a message to call on her. She complained of pain upon the left side extending to near the umbilical region, and she was quite sure that she was growing larger, or, as she had expressed it, the tumor had broken loose and was working up. I thought it worth while to make an examination, and to my surprise found that in place of the solid mass lying close to the ilium, there was an enlarged softened mass extending centrally to near

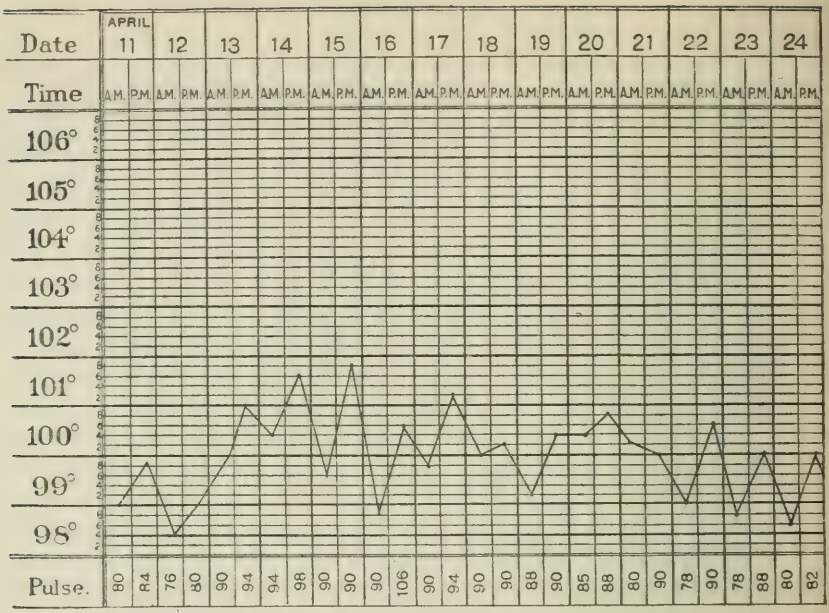
the umbilicus, and on about the same level. It gave a doubtful sense of fluctuation; from the vagina, no change could be detected. I thought at once of the case of Mrs. M., and suspected an abscess, and for several days I carefully watched the temperature, but it continued normal; pain and an enlargement and softening of the fibroid were the entire phenomena. Early in September she complained so seriously of the pressure of the enlarged mass, and fluctuation was so very evident, that I resolved to aspirate, and although the exhaust of the instrument was very perfect, I secured only about an ounce of blood-stained fluid of an unpleasant odor. At two other points that appeared promising the aspirating needle was inserted with the same scant result. No further attempts to diminish the size of the tumor were made. There was no change apparent in the growth examined by the vagina. I last saw her in October following, when she passed out of my hands. There were less pain, the parts having accustomed themselves to the change in the dimensions of the tumor; it was certainly no smaller, nor had it lost the fluctuation that first marked the change. A peculiar sensation imparted to the touch when the needle of the negative pole was inserted in the mass will be noticed in the narrative of the next case.

Case III.—Miss H., aged thirty-seven, Irish-born, first came to me from Dr. Pardee, of Fulton, Oswego County, in October, 1887. A firm indurated, irregular ovoid tumor filled the pelvis, crowding the uterus backward and to the left. The mass could be palpated through the abdominal wall in firm irregular outline with prolongation upon the right more elevated than the general of the mass, and filling the pelvis from side to side. She complained of considerable pain and discomfort through the pelvis, and had abandoned her occupation, that of housework, owing to the pain and increasing weakness. Menstruation was normal in frequency, and for the last year rather copious than formerly. I saw nothing further of her until she applied for admission to the hospital in April, 1888. She had lost flesh during the winter notwithstanding her idle life and a fair appetite. The tumor had increased somewhat in size with augmenting pain and discomfort. She was given scrupulous

antiseptic care for nearly a week after her admission, when, on April 9th, she was operated on under chloroform. The shot abdominal electrode was used, galvano-puncture being made with the negative pole; 100 milliampères were passed for ten minutes. She came out of the anæsthesia promptly and had neither shock, pain, nor discomfort. A matter to which I alluded in the former case as peculiar to the penetration of the needle into the mass of the tumor arrested my attention here. The needle encountered a resistance not by any means equal to that afforded by fibroids, which are difficult to penetrate. At the time I compared it to the resistance of well-cured American cheese, the density being uniform through, and not like that of entering a cyst, in which the obstacle is encountered in the wall. On palpation no relative difference could be detected between this and any other solid tumor. Only by thrusting the needle into it could this be made evident. This method of exploration I believe can be made of use in differentiating tumors, some of which are hostile and others favorable to electrolysis. On the evening of the 13th, starting from the morning normal, the temperature went up to 101° in the evening without previous rigor. There were some pain in the lower abdomen and slight tenderness on pressure. Fomentations were used, but no anodynes were given, as she slept fairly well without. As the temperature chart presents this phase of the case more graphically than words I will refer you to that, and call your attention to the behavior of the tumor. It was about the beginning of May that I became certain that the fibroid was becoming enlarged; not only that, but I could detect in its upper left margin a distinct fluctuation. I watched it with great interest, and could trace from day to day the slow upward encroachment of the mass, and the widening circle of fluctuation. From my former experience in the case of Mrs. M., I became suspicious of the presence of pus, and with a view of testing the matter I introduced an aspirating needle into the most prominent and softened portion of the tumor. The only result was about an ounce of bloody fluid of an offensive odor. By pushing the needle in further, or by inserting it in a new point, another ounce or so of the same fluid could be extracted by the aspirator

at each attempt, but without reducing the size of the mass. My intention was if the presence of pus was demonstrated, to open the abdomen and drain the abscess cavity, as it was becoming evident that the patient, unless relieved in some way, would die. It was clear, however, that any attempt to drain the numerous fluid spaces of the tumor would be impossible. I, as duty bound, offered the only alternative that furnished the least hope of relief to my patient, that of the removal of the tumor by laparotomy. The patient promptly rejected that, notwithstanding the candid answer to her question, that I believed she would die. During this period there was no change in either the size or density of the tumor as it could be explored through the vagina. In the last two weeks of her illness I could not detect any increase in the size of the tumor due possibly to the extreme prostration and the rapid wasting. She died June 9th, fifty-seven days after the operation. There was no arrest of the slow downward march of the fever. Quinine, antipyrin, antifebrin, were resorted to in vain. The only agent that would lower the temperature was the cold coil; but it gave her so much distress that it was only resorted to on three occasions, indicated in the temperature chart by double curves on the 4th, 8th, and 12th of May.

An interesting feature of the temperature range was its great moderation. On only three dates at considerable intervals did it exceed 103°; but on frequent occasions it spontaneously fell to the normal. I say spontaneously because it followed as a result of no medication, and only once as the result of the cold coil. It will be observed that the highest temperature followed the normal, and this may have been of the nature of a rigor. The fever seemed *sui generis*. The tongue and teeth were free from sordes; the bowels were confined and reacted normally to laxatives. Headache rare and moderate. In the latter half a slight jaundice. The body odors normal, without the peculiar odors of many cases of blood-poisoning. The moderate range of temperature through the long course, even at the period of extreme exhaustion toward the close, contrary to the natural history of these fevers—septicæmia or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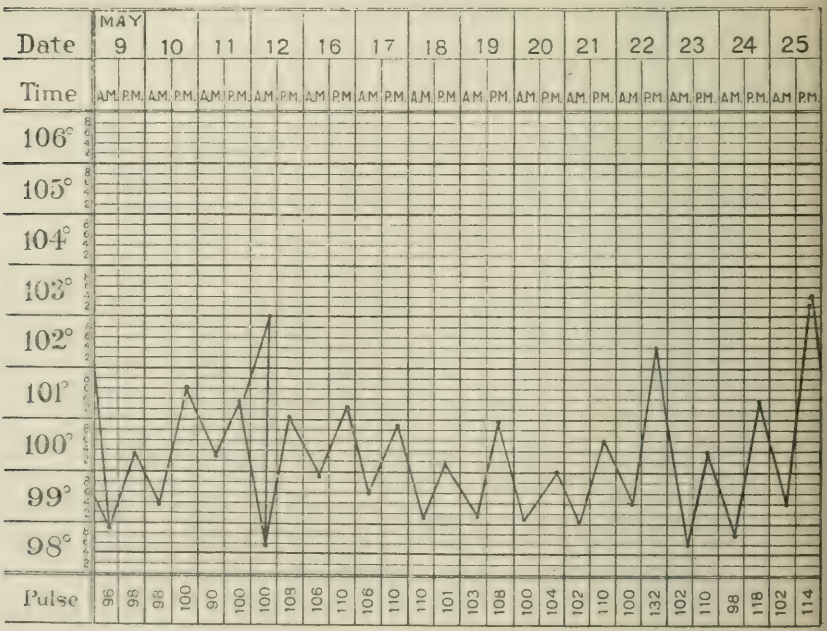
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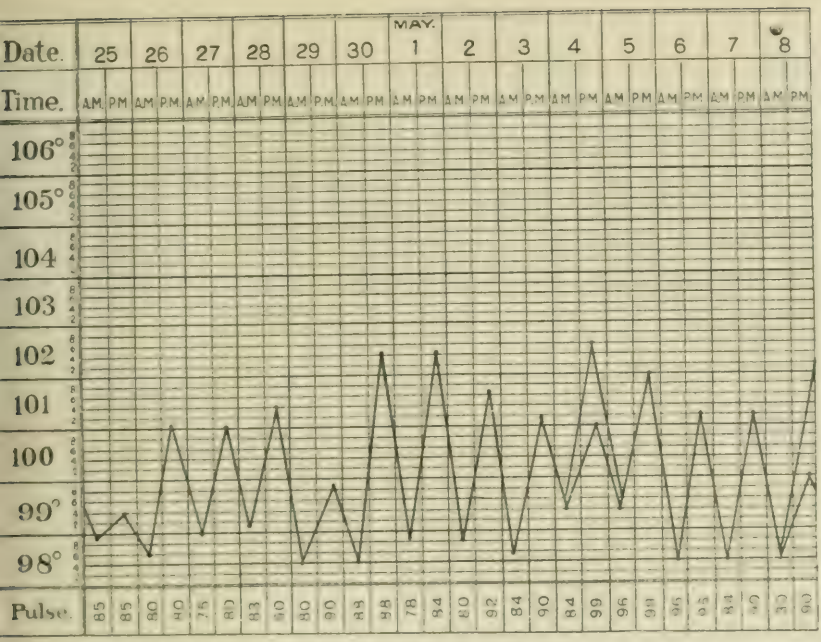
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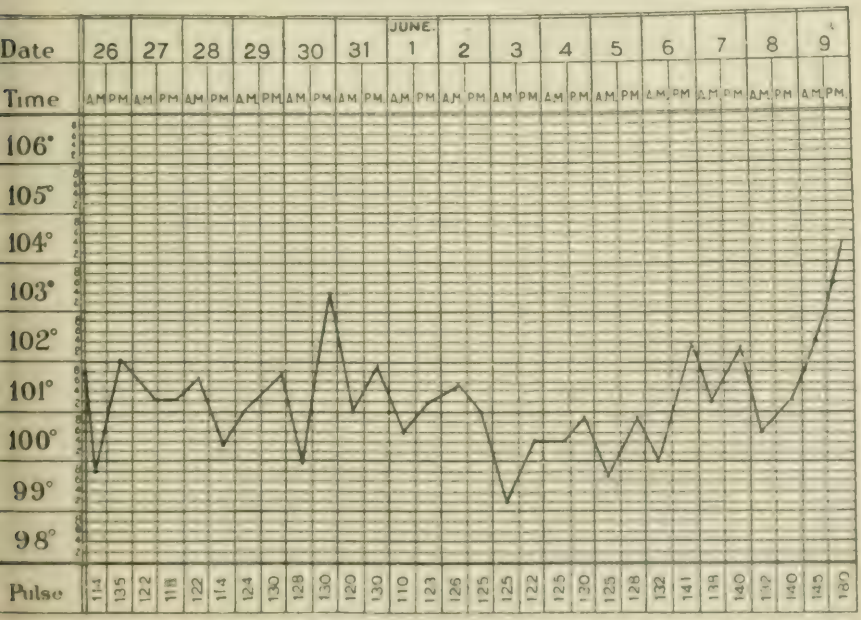
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pyæmia. It will be observed that the pulse rather than the temperature indicates the tendency toward fatal exhaustion. The incoercible character of the fever; its great irregularity independent of medication and periodicity; muscular pains and tenderness resembling myalgia, mainly in the lower extremities; loss of appetite nearly total; great thirst and profound mental apathy from the beginning; these peculiar traits lead me to hazard the opinion that the condition of the patient was due to the germs of a ptomaine developed by the decomposition of electrolysis, and not to pyæmia or septicæmia, as they are generally understood. A ptomaine is a chemical product, produced by splitting up of elements and a re-arrangement into a new compound within the body, hostile to the normal processes of life. Electrolysis, by its power to reduce compounds to their elements, would favor more than any other chemical agency the development of these products. Had this thought occurred to me during the progress of the case, I would have had it properly investigated. I throw it out now, that others may turn their attention to this important matter if opportunity presents.

From the small number of cases on record in which galvano-puncture has been the cause of abscess and cystiform enlargement of the tumor, and also from the experience gained in my own cases, I have been led to certain conclusions. I feel all the more free to state these without reserve, because I am able to do so in no partisan spirit, an element that, I regret to see, has intruded itself into this discussion abroad. On the contrary, I am an advocate of electrolysis, for in my experience I have seen an ample measure of good result, either in diminution of the tumor, or, what is oftentimes of equal value, a symptomatic cure.

I believe that the employment of electrolysis in fibroids will lead to new methods of diagnosis and to a more accurate knowledge of the natural history of these growths. In 1886, in St. Louis, before the Obstetrical Section of the American Medical Association, I stated from an experience already had

that it was an operation not free from danger, and that it must be used cautiously and with a proper regard for the character of the tumor. But it happened to be an electrical day for the Section, and my remarks were received almost with ridicule. All that I needed was a milliampèremeter, know my dose, and my patient was safe. A method of measurement is both proper and necessary, but instead of insuring safety it has given us a knowledge of the dangers of electricity. We now know that the comparatively small force of 100 ma. will kill or do irreparable harm to one patient, while 250 to 600 ma. may be used with safety in another, and in both cases we have to do with what are, to the ordinary methods of examination, solid tumors.

In conclusion, I venture to offer the following:

First. That galvano-puncture of pelvic tumors must follow careful discrimination of the character of the mass. That in certain forms cystiform degeneration is promoted to the discomfort of the patient, if not to the jeopardy of life. And this may result from the fact that tumors which appear solid may not be so, but have alveolar spaces of various and irregular size filled with fluid, with intervening trabeculæ of varying thickness that give to the whole mass the appearance of solidity. This condition has been regarded as the degeneration of a pure fibroid, a fibro-cyst *de novo*, or a fibroid with disseminated lymph spaces. Whatever may be the pathological condition involved, I believe that the group of tumors enumerated may prove hostile to electrolysis. We have in such instances the elements of cystiform degeneration already existing in the lymph spaces, which is quickly intensified by the electrolytic current. The trabeculæ separating these spaces become thinned by the pressure of the accumulating fluid, and as a consequence the general mass becomes greatly enlarged with widespread fluctuation, and, owing to the structure of the tumor, impossible to drain.

Second. The fluid so accumulating may become purulent, from either bacterial infection or from the effect of the cur-

rent, and owing to the peculiarity of structure be impossible to drain, unless it results in general abscess of the fibroid mass, which it may do (Case I.).

Third. Peculiar changes may be induced in the fluid from the passage of the current, either septicæmia or due to the formation of a ptomaine in the presence of its germ, that result in a chronic form of blood-poisoning with fatal exhaustion. The absence of pus in such cases points to the exemption of bacterial infection, and the absence of putrefactive changes (Case III.) shows the presence of some other form of poison. When we take into consideration the reducing action of electrolysis upon fluids—a splitting up of chemical compounds to original elements and the formation of new compounds—it is possible to suppose that the conditions are peculiarly favorable to the development of a ptomaine.

Fourth. In order to render galvano-puncture of pelvic tumors safe, special diagnostic precautions must be taken. It must be proved that the tumor is solid and free from lymph spaces. This can be done only by exploration with the aspirating needle, which should be made with careful antiseptic safeguards. If by this means it is proved that cystiform changes are present, the tumor is not a suitable one for electrolysis.

DISCUSSION.

Dr. F. H. Martin, of Chicago.—The paper has taken an entirely different course from what I expected from the title. Dr. Van de Warker, in his paper, has covered the points to a great extent. The dangers in electro-puncture are those that may be avoided; they are included under the following heads:

1. Improper current.
2. Improper selection of cases.
3. Improper selection of point of puncture.
4. Insufficient antiseptic precautions.
5. Improper electrodes.
6. Bungling operators.

Some of these have been considered by the author of the paper.

I will consider them under their different heads:

Improper Current.—The current should be perfectly smooth and free from interruptions, and for that reason a gradual rheostat should be employed always with a battery irritation. A milliampèremeter should be used so as to avoid going above the point of safety, as shown by experience and by experiment; for every twenty-five milliampères of current in contact with the surface, one square centimetre of surface should be exposed, or for four square centimetres of surface, the ordinary surface for electro-puncture, about 100 milliampères of current should be administered.

Improper Selection of Cases.—No cases of fibroid tumor should be operated upon by electro-puncture in which it is possible to reach into the uterus by the cervix, with a sound, unless the greater portion of the tumor be posterior to the cervix. Under these circumstances only a vaginal puncture should be used in the posterior portion of the tumor. Under other circumstances, in which it is impossible to reach the tumor by an electrode, puncture may be used.

Improper Selection of Point of Puncture.—The point of puncture should be in the vagina or through the cervix itself, if it can be reached.

Antisepsis.—This, of course, should be carried out in every detail; the needles should be of such a character that they can be washed and scrubbed thoroughly in a solution of bichloride or of any other good antiseptic solution; a vaginal injection should be used before the operation, and continued for some time afterward.

Improper Electrodes.—The electrode should be insulated up to within an inch or an inch and a quarter of the point, and the insulated portion of the electrode should be entirely incorporated within the tissues to be acted upon.

Of course, we must take into consideration *bungling operators.* Electricity is a means of treatment that should be studied and used carefully, the same as Battey's operation, or any operation in surgery, and experience, of course, will tell in the use of electricity as much as in these other operations.

Dr. R. S. Sutton, of Pittsburg.—How many fibroids have you cured by electrolysis?

Dr. Martin.—I have reported fifteen cases of fibroid tumor treated by electricity. Of these fifteen cases, five were absolutely cured, five were symptomatically cured, and five are still under treatment. The five that were absolutely cured were very small fibroids, and in each of these instances the diagnosis can be verified by other physicians.

Dr. Sutton.—How many deaths have you found occurred from this treatment?

Dr. Martin.—There were no deaths from electrolysis that I know of. I had one case of pelvic abscess in a woman who was sent to me, and who had had three pelvic abscesses before I saw her. She recovered, however, and is now well.

Dr. A. J. C. Skene, of Brooklyn.—I would like to ask Dr. Martin how many milliampères of current he would use with the ordinary electrode, with a needle three-quarters of an inch long?

Dr. Martin.—I endeavored to make that point plain in my discussion of the paper: for every square centimetre of surface there should be twenty-five milliampères of current—that is, where I use an electrode in the uterus. An electrode the size you speak of, three millimetres in diameter, would require about seventy-five milliampères current.

Dr. Skene.—An electrode, say two and a half inches long, the whole length of the instrument, how strong a current would you use then?

Dr. Martin.—All electrodes should be graduated, and the strength required marked on the electrode; the largest electrode requires a 100 milliampère current.

Dr. Skene.—How much current will a patient bear without ether, with that size electrode?

Dr. Martin.—About 100 milliampères.

Dr. Theophilus Parvin, of Philadelphia.—Probably no more important subject for discussion could be presented to the Society. Without any personal experience in the application of electricity in the treatment of uterine fibroids, I have witnessed in a few cases its employment by others, and I have given some attention to the study of the matter. Having been present at the last meet-

ing of the British Medical Association, I heard Apostoli's paper, and the discussion of the subject by Sir Spencer Wells, Aveling, Lawrence, Harvey, and others in favor of the treatment, and of Imlach and a few in opposition to it. While the majority who spoke advocated the electric treatment of uterine fibroids, claiming that the symptoms caused by these growths were mitigated or removed, not one stated that he had ever seen a tumor disappear.

In England I heard of cases dying from septicæmia after the use of electrolysis. A still more striking case illustrating one of the dangers of the treatment came to my knowledge just before leaving London; the facts were given me by an eminent member of the profession who made the autopsy of a woman who bled to death from sloughing of the greatly enlarged circular artery, I believe, or one of the uterine arteries. As a report of the case is to be published by the operator himself, an able and distinguished physician, I violate no confidence in referring to it. The woman had a fibroid occupying such a position that the uterine electrode was not passed into the cavity but remained in the cervical canal; hemorrhage came on during the *séance*, and, of course, the application was discontinued; the tampon was used, and temporary arrest of the hemorrhage accomplished, but it recurred in a few hours, and, as I have said, was mortal. Now these statements are not made for the purpose of discrediting the treatment of fibroids by electricity, but simply to show that the method is not free from danger. I ought also to add that, in Great Britain at least, puncture of the fibroid by the uterine pole is not usually, if at all, employed.

I do not think that the electric treatment can or ought to be employed by everyone; it is not as simple a thing as some have supposed, but should be confined to those who have made a special study of the subject, specialists among specialists.

Dr. Skene.—I have employed this treatment in fifty or more cases; the great majority of them were improved, some few cured, and several were not helped much, if any. I will mention the case of a patient who was under treatment before she came to me. She went to Dr. Drysdale, of Philadelphia, and was treated for six months; she then returned, and I had the

pleasure of seeing her two weeks ago, and I assure you that she has recovered. She is not only symptomatically cured, but the tumor has gone. In one of Dr. Freeman's cases, which I saw, the tumor was seven inches in its long diameter, and the uterus was restored to its normal size or nearly so. I have heard of fatal cases, but they have all been cases in which the tumor was punctured; I have not had any fatal cases in my practice, but I have avoided puncture.

I will cite one other case, which can be substantiated by another physician, so my own views alone need not be taken. This I prefer to do because I know that with anything new we are so apt to become enthusiastic that we may be self-deceived and err in judgment. This patient was the sister-in-law of a prominent Brooklyn physicians; she had a fibroid which extended up above the umbilicus, and suffered from menorrhagia. She was about six months under treatment. Apostoli's method was employed, as near as we could, modifying it only by using cotton instead of the clay, etc.; the tumor disappeared almost wholly, although at the time she left the uterus was still larger than normal and somewhat irregular in outline. She reported through her physician in Alabama to her brother-in-law in Brooklyn that she was doing very well, and the latest report from there is that she has had occasion to employ an obstetrician. I think that case has been fully cured.

Three, then, in my limited experience can be fully authenticated as cured, and my experience being limited, that ought to go a good way as testimony that this treatment is worth something.

Dr. H. P. C. Wilson, of Baltimore.—Everything that is powerful for good is powerful for evil: accidents have occurred and will occur till the proper use of electricity, as a therapeutical agent, is better understood, because it will be more used in the future than in the past. In my own experience, when I consider the crude manner in which I have used it, without any precise knowledge as to the different effects of positive and negative, galvanic and faradic currents, with ignorance of exact dosage, I think myself most fortunate that no accident has occurred in my hands, and I do not wonder that accidents have occurred in other hands.

I believe that the use of electricity in medicine and in the treatment of fibroid tumors is in its infancy, but I believe that it has a great future before it. I have had considerable experience with it in the past year. I had one case that altogether excluded hysterectomy; I used electricity on the woman and her fibroid tumor was considerably diminished, certainly one-third to one-half, and from being a miserable and indolent woman, she became active, comparatively comfortable, and greatly improved.

This summer, while I was in Europe, I spent ten days with Dr. Apostoli, and I saw something of Dr. Skene Keith. Those gentlemen do not claim that the use of electricity always causes a fibroid tumor to disappear, but, as Dr. Keith said to me (and we know he is conservative and cautious in his statements), if he has a patient who is incapable of performing the duties of life with a fibroid tumor, and by the use of galvanism she becomes an active, comfortable woman, although the tumor may not disappear, he considers he has accomplished a great result. He says that any man who performs hysterectomy for a fibroid tumor, before he uses galvanism, is guilty of malpractice.

He told me that within the last year and a half he had had over one hundred cases of fibroid tumors, and twenty of these he considered proper ones for hysterectomy. No one has had a better record for hysterectomy than the Keiths, and yet they have not done one for over eighteen months. His fibroid tumors do not always disappear: they are reduced in size; they remain as semi-foreign bodies in the body with their vitality destroyed, and the woman from being miserable and wretched, comes to be comfortable and active.

These are a few of the thoughts I gathered from these gentlemen, and I came home greatly impressed with the future of electricity in cases that, up to the present time, we have sought in vain to cure. Take those cases of fibroids that are constantly coming to us, in which operations are out of the question; take those cases of chronic cellulitis in which we find the uterus set in a mass of lymph, as if in putty, in the pelvic cavity. What can we do with them? Who cures them? They are the bane of our lives. In many of these cases I believe nothing will be found as useful in the future as electricity; that nothing will produce the absorption of these masses as rapidly.

As I said, it is as yet in its infancy. There are a few men, like Engelmann and Van de Warker, who are studying this subject, who will be experts in it, but most of us are tyros in the knowledge and use of electricity, and I think that accidents, and sometimes deaths, must occur until the proper application of this most useful agent is better known.

Dr. H. W. Baker, of Boston.—I am already on record on this subject some two years ago in this Society. I agree with Dr. Van de Warker in regard to all his conclusions, so we have nothing to discuss so far as that is concerned, but how he should run into such dangers, and I should escape, is what I cannot understand, and I think it must be something more than luck.

If I may be allowed to criticise Dr. Van de Warker's cases, I should say that when I practise galvano-puncture I never send the patient home in a carriage soon after the operation. I treat the patient exactly as I would after a serious operation. She is anæsthetized, and all antiseptic precautions most carefully carried out; she is put to bed, where she remains for a week or ten days, and she is treated during that time as if some serious operation had been performed. By carrying out such a careful procedure as this, in a large number of cases treated, I have never had such results as Dr. Van de Warker has mentioned, and I have never had a death. In two cases I have had some rise of temperature for a few days, and have been a little concerned in regard to the patient's condition. In these cases it was accounted for by the material with which the needle was insulated coming off during the application, and therefore, having a non-insulated needle going from the outer abdominal wall into the substance of the tumor, it was sufficient to account for all the trouble which arose. The temperature finally subsided, and all went on rightly afterward.

I agree with Dr. Martin and Dr. Wilson, that there is a large future for this treatment, of not only fibroids, but the various inflammatory effusions.

Dr. Van de Warker.—I do believe in the future of electricity in the treatment of fibroid tumors, but I think the day of humbug and claptrap in the matter is past.

What I will emphasize in reply to the remarks of Dr. Martin

is, that I believe that certain forms of seemingly solid tumors are hostile to electrolysis. I do not care where you puncture them, with what you puncture them, or how many milliampères the current measures: I believe from their structure that electrolysis is hazardous and may terminate in death. I want particularly to call the attention of the Society to the fact, that some of these cases show the development of cystiform changes in the midst of what is seemingly a solid fibroid, and that the future use of electrolysis in fibroids will depend upon the differentiation of those tumors from those which are free from lymph spaces.

In the matter of the criticism of Dr. Baker, it was well taken, but that was the patient to whom I did the least harm; that was Case II., in which we simply had an increase in the amount of cystiform degeneration of what was apparently a solid mass. As to the method of differentiating, I think the aspirator, under rigid antisepsis, is the best.

I believe that where you use a current of considerable force, it is better to give the patient an anæsthetic, under antiseptic precautions. In regard to electrodes, I believe much depends upon that. Dr. Martin indicates what is a safe amount to apply to a certain square surface, but that cannot represent the matter at all. The working result is represented by the current less the resistance you have through the tissues in connection with the abdominal electrode. The current used to overcome the resistance in the tissues is used and worked up, and its force is expended entirely in another direction, and not in the direction of electrolysis. In the use of this water electrode, it simply introduces an immense resistance into the current, so that the number of milliampères you use is indicated by that which is left after overcoming the resistance, and consequently have to make altogether another calculation as to how much effective current you have left.

I repeat, however, that there is a certain group of tumors hostile to electrolysis, and in which it does harm instead of good. I have seen splended results from electrolysis, but in the majority of cases symptomatic cure rather than positive cure, and I feel free to place myself on record in that modified way, in regard to the question.

THE TREATMENT OF CHRONIC ENDOMETRITIS BY DRAINAGE, WITH DRY MEDICATED GAUZE, JUTE, OR OTHER ABSORBENT SUBSTANCES.

By William M. Polk, M.D.,
New York.

The frequency of chronic endometritis and its obstinate resistance to treatment are my excuses for bringing before you a measure which has met with some success at my hands.

The varieties of this disorder found in practice may be summed up under the purulent and the hemorrhagic forms. The atrophic form seems but an advanced stage of one or both of these two, and consequently for the purposes of this paper may be ignored, the catarrhal form seems too to be but an introduction to the purulent variety; it, therefore, may be regarded as a subdivision of this variety.

Chronic endometritis exists as the leading disorder, in certain cases, but perhaps more frequently it is found as one secondary to another. An example of the first is witnessed in gonorrhœal infection; an example of the second is seen in conjunction with displacements, cervical stenosis, tubal disease, and with neoplasms, as in fibromas and retained secundines. The tendency of the affection is toward the production of tissue changes, not merely in the endometrium, but in the underlying structure, causing, among other results, a perversion of the menstrual and procreative functions. In the case of the hemorrhagic variety, there is ground for the suspicion that the hypertrophic changes may in some cases even be the forerunner of a malignant formation.

Because of its frequency, of its decided perversion of function, and of its dangerous tendencies, the disorder has received as much attention as any other within the range of our specialty. The literature of the disease, especially that part which relates to therapeutics, is consequently exceedingly rich.

The etiology, pathology, and symptomatology may be said to rest upon a secure basis, but we cannot say as much for its therapeutics. One need only point to the diverse opinions now entertained upon this latter point, to realize the truth of this statement, and if we look to the utterances of the best informed upon the question of prognosis, our doubts will be confirmed. This fault applies, however, more to that group of cases in which the disease exists as the leading disorder in the group, than the affection when presented as one secondary to another condition; as in the displacements, in stenosis, and in tubal disease, the removal of the primary condition seems all sufficient for the disappearance of the secondary.

Still, even in such cases there are instances in which, whether from the long duration of both cause and effect, or from other local or general influences, the disease becomes so deeply imbedded as to prevent eradication, even though the initiating influence be removed. It is then to the first group and to those of the second, which remain after the apparent cause has been removed, that I ask your attention.

These cases present an enlarged uterus, one whose cavity is increased in size; in some the cavity is encroached upon by an endometrium more or less thickened. The os internum and generally the os externum are more open than in the normal condition, but practically the os internum may be less open, owing to the encroachments of the thickened endometrium.

I will not detain this audience with a reference even to the methods of treatment now in vogue in this disease, but will call attention to the principles which govern us in the treatment of inflamed cavities in general, and proceed at once to

lay before you the plan here suggested, which is based upon those principles.

The interior of the uterus is a natural cavity, given a chronically inflamed natural cavity, the essential for cure is drainage; without this, topical applications, which experience shows are beneficial and even necessary in many instances, are apt to be abortive and even injurious. Heretofore drainage when applied to the uterine cavity has been thought very difficult.

The objective point to be reached and overcome is the internal os; given a free opening there, and the chances are that the remainder of the canal, uterine and cervical, will offer but insignificant opposition to the free discharge of the uterine contents. This being fully recognized, a remedy was sought in the free dilatation of the internal os, in conjunction with such topical applications as were deemed appropriate. The violence needed to secure proper dilatation begets, however, such tumefaction as practically to close the os in a few hours. Seeing that mere dilatation could not be relied upon, hard and soft drain tubes were suggested and employed.

The hard were open to the objections growing out of their troublesome and sometimes dangerous pressure-effects, and, moreover, the tubes used had to be of such size as to afford too narrow a passageway for the amount of material that required drainage. The soft were open to the objection that they tended to collapse under the pressure brought to bear upon them, and both, especially the latter, to the fact that it was difficult to keep them in place.

But, besides all these objections, there was ever present to the minds of every one that dread of introducing foreign substances into the uterine cavity, which has been so often emphasized by the disasters consequent upon such interference. However, the results reported by Vullicts (*Nouvelles Archives d'Obst. et Gynecol.*, January, 1886) encouraged me to look again into this subject of uterine drainage. I here present an abstract of his article:

"The aim is to obtain permanent dilatation of the uterine cavity allowing application of treatment under eye. The method is easy, free from danger, but tedious. Dilatation once obtained persists for weeks or even months. Patient in Sims's position—moderate amount of dilatation by steel branched dilator—if cervical canal not patent. Small tampons of iodoformed cotton, with string, pressed beyond internal os. First sitting three or four introduced and left in twenty-four to forty-eight hours. Then replaced by greater number—object being to fill the uterine cavity completely at each sitting. Uterus shows great tolerance for this tamponade. Vulliet has seen no untoward result beyond little colic at first sitting. Laminaria tents may be used for more rapid dilatation if desired. Cavity of uterus gradually distended, and at end of treatment vagina and uterus form single cavity. Vulliet has used this method in a number of cases of cancer, in three cases of sessile polyp, in fibro-myomata and in few cases of endometritis. The time requisite for full dilatation is variable—from three days to a month."

The plan I selected and here suggest, while in the same direction, is simpler, and I believe efficacious. Its object is to supply an efficient method of draining the uterine cavity while at the same time it affords a ready means of medicating the diseased surface. The essence of the procedure is the employment of an absorbent substance, capable of acting as a drain, upon the principle of capillary attraction. Any substance possessed of this property, efficiently, might be employed.

It is to be introduced into the uterus in much the same manner as prevails in the employment of similar substances, for a like object, in other cavities.

Before describing the method in detail, let me say that it is more radical than any plan now accepted. It is more of an operation, but because of its thoroughness I believe it is far more efficacious, shortening a treatment notoriously long and vexatious as now practised, and capable of giving a larger

percentage of cures than we now obtain. I have been surprised at the slight inconvenience caused by the treatment, and as for its dangers, I believe them to be less than those attending present methods. I am led to this belief, not only because of my experience with it, but because the procedure, more than any other, rests squarely upon the corner-stones of surgery—*cleanliness* and *drainage*. The first act of this treatment demands the same careful preparation that is called for by a laparotomy. The directness of the line of communication (the Fallopian tubes) between the interior of the uterus and the peritoneal cavity should never be lost sight of: therefore, every detail of antisepsis is to be rigidly enforced throughout the entire procedure, but more especially should it be observed as a preliminary to the first act of this treatment. This first act consists of thorough dilatation of the entire cervical canal from internal to external os, then cleansing of the uterine cavity with a warm solution of bichloride of mercury (one to three thousand), employing the intra-uterine douche for that purpose. The next step depends upon the condition present in the endometrium. If there be marked hypertrophy, as is probable in the hemorrhagic forms of this disease, or if there is reason to suspect the presence of portions of a decidua the curette should first be employed, otherwise we proceed at once to pack the uterine cavity. Should the curette be used after its employment, the cavity should again be freely irrigated with the same solution as before, merely raising the temperature from warmth to heat should undue hemorrhage demand it. I will say here that rather free bleeding from such a surface is often beneficial, serving the same purpose for the body of the uterus, as incision so frequently does for an engorged cervix. In selecting a substance to be used for the packing, I have preferred the cheese cloth used in the preparation of iodoform, and other varieties of antiseptic gauze, because its texture was such as to admit of its being medicated with any substance, soothing, stimulating, irritating, or even corrosive, that might be deemed appropriate to the case. I will say,

however, that for any form of endometritis, one need hardly go beyond the stimulating substances commonly used in the treatment of chronic inflammation as found in other mucous surfaces. The gauze is cut into strips about half an inch wide, and from two to six feet in length, the greater being required when the uterine cavity is much enlarged. Its introduction is accomplished as follows:

The uterus is fixed by means of the volsella, then by means of a long pair of narrow uterine dressing forceps whose ends are bulbous; the gauze, in small sections is carefully carried into the uterus until the cavity from fundus to cervix is easily filled, the surplus is coiled in the vagina. In a few cases, owing to inequalities in the cervical canal, I have found that the introduction was more readily made through a large cervical protector or speculum. It is needless to say that, for this initial dilatation, anæsthesia is a necessity, but for subsequent treatments which I now speak of, nothing beyond the local use of cocaine is demanded, and even cocaine is not called for in most of the cases. The gauze may be left in place from twenty-four to forty-eight hours, then by drawing upon that which is in the vagina, the whole is easily removed; the vagina, cervix, and uterine cavity should now be irrigated with simple warm water, and the gauze introduced as before. The treatment should be commenced as soon after a menstrual epoch as possible, and should be continued ten days, or to within five days of the succeeding epoch, supposing them to be at intervals of twenty-eight days; the severity of the case determining the length of the treatment. In the hemorrhagic forms the next menstruation should be carefully studied, as the quantity and quality of the blood loss are the best indications of the effect of the treatment. In the other varieties of the disorder, a careful examination two or three days after the cessation of the flow will afford the best evidence of success or failure. The uterus in all varieties should be reduced in size, menstruation should be normal or nearly normal, and there should be little or no discharge.

If these conditions should not appear, the treatment is to be continued through this inter-menstrual period. Additional divulsion of the cervix will not be needed, such contraction of the internal os as may recur is easily overcome by the Hanks or similar dilators, aided by cocaine. Rest in bed appears to be an essential adjunct to this treatment, but I have been surprised to find my hospital patients out of bed, walking around the ward with the uterus full of gauze. In answer to remonstrances they said they felt no inconvenience, and therefore preferred to be up; still, it is more prudent to keep them in bed. In all these cases scrupulous attention to the general health is of great importance: the bitter tonics, iron, by preference the iodide, together with cod-liver oil, are therefore indicated. When they can be provided, warm baths with massage are valuable adjuncts, seeing that by such measures we aid general nutrition, and best promote the action of that most valuable excretory organ the skin. As regards the use of ergot in these cases, I am not clear; my predilections, however, are in its favor. I would suggest, therefore, that it be used in full doses, my preference being for the aqueous extract, which can be given in capsules. Up to the present time, my experience in this treatment has been confined solely to chronic cases of endometritis, but I believe the principle involved applies with equal force to acute cases, and when we remember the dependence of salpingitis upon both acute and chronic endometritis, it would seem that in this method of draining the uterine cavity we might find a ready and safe means of mitigating, and even arresting, tubal inflammation.

Another field for application of this kind of drainage is the endometritis and metritis of the puerperal state, but of its effects here I am as yet without sufficient experience; as an adjunct, however, to the intra-uterine douche, I shall employ it upon the first occasion.

In conclusion, allow me to present for your consideration a tabulated statement of the cases in which the treatment has been employed. In two of the cases slight uterine colic, last

Report of Cases of Endometritis Treated by Packing Uterine Cavity with Iodoform Gauze.

No.	Name.	Age	Admission.	Cause.	Duration.	Type.	Uterine size.		Cervix.	Pelvic inflammation.		Discharged.	Result.	Packed.
							Before.	After.		Before.	After.			
1	A. B.,	30	May 23	Cold.	2 years.	Purulent.	2¾ in.	2½ in.	Lacerated.	Left side.	None.	Aug. 3	Cured.[1]	6 times.
2	M. S.,	23	June 14	Cold.	9 months.	Hemorrhagic	3 "	2½ "	...	Right side.	None.	July 6	Cured.	Twice.
3	J. V.,	35	March 16	Anteflexion.	3 years.	"	3 "	2¾ "	...	Both sides.	None.	April 29	Cured.	3 times.
4	T. R.,	24	April 2	Anteflexion.	3 years.	"	3¼ "	2¾ "	Lacerated.	Left side.	None.	May 25	Cured.	4 times.
5	S. L.,	35	Feb. 5	Anteflexion.	2 months.	"	3 "	2½ "	Lacerated.	...	None.	May 5	Cured.	3 times.
6	C. L.,	32	Aug 12	Cold.	8 months.	"	3½ "	2¾ "	...	...	None.	Not discharged.	Improved[2]	3 times.
7	H. W.,	35	April 25	Miscarriage.	2 years.	"	3½ "	3 "	Lacerated.	...	None	Not discharged.	Improved.	6 times.
8	M. D.,	33	Sept. 22	Miscarriage.	6 weeks.	Purulent.	3 "	2½ "	...	...	None.	Oct. 5	...	Twice.
9	H. C.,	41	Aug. 12	Cold.	3 years.	"	3 "	2¾ "	...	...	None.	...	Improved.	None.

[1] The term cured refers only to the result as seen up to the time of discharge.

[2] Nov. 30th The four cases marked improved have been discharged as cured.

ing but an hour or two, was produced, in the others nothing more than a slight sense of fulness was experienced. In spite of Vulliet's assurance to the contrary, I feared some developments pointing to tubal inflammation and perhaps peritonitis, but at no time in any of the cases have I found a single evidence of such complication. If this freedom from ill consequences continues to mark the treatment, the ease with which it can be employed, and the improved results, will commend it favorably to everyone. I am indebted to Dr. Coakley and Dr. Martinez for the execution of most of the detail of the treatment in all the cases, and to Dr. Martinez for the tabulated statement.

STERILITY, AND THE VALUE OF THE MICROSCOPE IN ITS DIAGNOSIS AND TREATMENT.

By H. Marion Sims, M.D.,
New York.

Probably the gynecologist of to-day is consulted more often in regard to the sterile condition of woman than for any disease that the sex is liable to. My own experience in this line has been very large, and I do not treat any form of uterine trouble which has a greater degree of interest to me than sterility in woman.

According to Sir James Y. Simpson, about one in ten of all marriages among the working class is unprolific, and about one in six among the aristocracy. It has been generally stated by him that every eighth marriage is unproductive.

Generation is effected in both the animal and vegetable kingdoms by the conjoint action of male and female germs. In the animals the male and female are twain. In the vegetable kingdom this is sometimes so, but usually the male and female elements are found in juxtaposition in the same organism. In man and other animals the semen of the male must be brought in direct contact with the ovum of the female to insure fecundation.

If the male, by cause of old age, sickness, or accident is incapable of performing the sexual act, he is said to be impotent. He is sterile when the semen lacks spermatozoa, which are essential to fructification. A woman is said to be impotent when there is any physical obstacle to the performance of the sexual act. She is sterile when there is any obstacle to prevent the union of the spermatozoa with the ovum.

The male may be able to perform the sexual act in the most vigorous manner, and yet be sterile or incapable of procreation when the semen lacks spermatozoa. This deficiency may be natural or acquired. A man may be born with but one testis, and then, as a rule, it does not furnish zoösperms, or he may have two, but which are so imperfectly developed as to remain always in the cavity of the abdomen, as in the fœtus; and then the seminal fluid may be deficient in the all-important property necessary to fecundation. This condition is often acquired, and generally the consequence of youthful indiscretions. Whatever produces an inflammation of the testes in the male may bring about such a change in the secretory apparatus of these organs as to destroy the vitalizing power of the semen. A fall or a blow might do it, but the most common cause is inflammation communicated to them by a gonorrhœal inflammation of the urethra, neck of the bladder, and vesiculæ seminales. Not infrequently this happens as a result of parotitis, where, from cold or other cause, the inflammation is translated from the parotid gland to the testes. Any man who has suffered from orchitis from any of these causes may suspect himself of incapacity for procreation, notwithstanding the normal power of his animal propensities. He is not of necessity sterile, but he may well feel anxious about it till it is otherwise proven.

To determine the source of unfruitfulness in any given case it is necessary to examine into the condition of both male and female.

The following questions must be settled:

1st. Is the male competent to perform the sexual act?

2d. Is the female competent for the married relation?

3d. Does the seminal fluid possess zoösperms?

4th. Do the zoösperms enter the canal of the neck of the uterus?

5th. Is the mucus of this canal fit to sustain the zoösperm alive?

The first point is ascertained by a simple question. The

second by examination; but the others can only be determined by the use of the microscope. A drop or two of the semen taken from the vagina, or from the cervical canal soon after coition, and placed under the microscope will show the presence of zoösperms in great abundance if the semen is normal and fit for procreation. But if these are wanting, then fecundation is impossible. This condition is found oftener in man then is generally supposed. It is sometimes curable, oftener incurable. A man may be incapable of procreation at one time, and by appropriate treatment under favorable circumstances he may regain his lost power. But the removal of this incapacity in the male is not generally so successful as the removal of the obstructive causes in the female. When the male is capable of performing the sexual act even feebly and unsatisfactorily, if we find the seminal fluid in a normal state and full of living spermatozoa, we may take it as proven that the fault does not lie with the male; and we then proceed to inquire into the aptitude of the female for conception.

I have said that the zoösperm of the male must be brought into direct contact with the ovum of the female to insure conception.

In a sterile case we must then determine what obstacles intervene to prevent this important junction. To comprehend these points fully, let us glance at the position and relation of the female generative organs. The vagina is for the reception of the seminal fluid; the uterus for the reception and maturation of the ovum till the full term of parturition. The ovaries are the source of the ova, without which there can be no conception. The Fallopian tubes serve to conduct the ova from the ovaries to the cavity of the uterus. Conception can occur at any time while menstruation exists—even irregularly. It has occurred as early as ten years of age—as late as fifty-two or fifty-five, and is said to have occurred as late as sixty. Menstruation may be taken as the sign of the fitness of the female for conception. The ovum is liberated from the ovary

and is slowly carried along the Fallopian tube into the cavity of the uterus, where, if it has met with the vitalizing zoösperm of the male, it becomes a living organism, attaching itself to some portion of the walls of the womb, where it grows and develops to full term. But if, when it reaches the cavity of the uterus, it has not been fructified, then it passes off, after remaining there awhile, with the secretions that belong to the uterine cavity. The time taken for the ovum to pass along the tubes varies, according to Pouchet, from two to six days. Ritchie, of Glasgow, believes, with many other modern physiologists, that the uterus itself is the normal seat of conception. But Bischoff believes that among the mammalia fructification occurs before the ovum reaches the uterus. Coste thinks it takes place in the Fallopian tube, and that the fructified ovum then passes into the uterus. Nuck and Haighton have both demonstrated this on the dog by ligating the tube at the cornu uteri two or three days after copulation and subsequently finding the fructified ovum between the ligature and ovary. Prévost and Dumas have found the zoösperms in the tube several hours after copulation, and Haller has seen them on the ovary. Gévault has made some interesting experiments on the rabbit and found the spermatozoa only in the vagina and a few in the uterus immediately after copulation; but in an hour after he found great numbers of them in the uterus, or in five hours they were to be found half way in the oviduct, and in ten hours they were in the fimbriated extremity. These physiological observations in the lower animals seem to establish the fact that the ovum is fructified before reaching the uterus—and there is no reason why the same laws should not operate in the higher animals —with a knowledge of the laws of conception we can better understand the operation of causes that interfere with it, and thus produce the sterile condition. Whatever obstructs the passage of the ovum from the ovaries to the cavity of the uterus, and whatever obstructs the passage of the zoösperm to the ovum are causes of sterility. Some of these are incurable,

while many are amenable to treatment. If the menstruation is normal, we take it for granted that ovulation is normal, that the ovum is at the proper time discharged from the ovary and starts on its way to the cavity of the womb. But some previous pelvic inflammation may have obstructed the tubes or bound down their fimbriated extremities so as to prevent them from fulfilling their functions in conducting the ovum to the cavity of the uterus. That state of things we can hardly diagnose with any degree of accuracy, or treat with certainty. Our efforts at diagnosis and treatment must therefore be directed mainly to the state of the uterus itself, and to such conditions as interfere with the passage of the living spermatozoa to the cavity of the uterus.

Any marked and permanent deviation of the uterus from a normal position, whether anteriorly, posteriorly, laterally, or downward, may and does at times interfere with conception. When there is extreme anteversion with the os tincæ looking back toward the hollow of the sacrum, complicated as it usually is with congestion of the whole organ, conception is not likely to occur. When there is extreme retroflexion, with its usual attendants, the uterus must be restored to its normal position and held there. Fortunately this can be done in the majority of cases with considerable facility and certainty.

Lateral malposition and prolapsus require the same attention and nicety of rectification. But the more frequent cause of sterility is found in the cervix and cavity of the uterus. The cavity of the uterus may be the seat of tumors or vegetations which must be removed, of inflammation which must be overcome, or of abnormal secretions which must be corrected. During progress of the treatment of such cases the vaginal and cervical mucus should occasionally be examined by the microscope several hours after intercourse. By the condition in which you find the spermatozoa it will be easy to determine whether the case is improving or at a standstill. When the secretions are abnormal the zoösperms will all be found dead, but as the case progresses toward complete recovery

the zoösperms will be seen to become more and more lively, and for a longer time after intercourse, until, at last, when the condition is normal, I have found living spermatozoa in the cervical mucus as much as thirty hours after coitus. The patient can then be discharged as cured and is more than likely to become pregnant.

Another cause of the sterility may be that the os tincæ is so very small that the semen cannot enter the cavity of the uterus. This condition may be accurately diagnosticated with the aid of the microscope. By taking the secretion from the vagina on one glass slide, and that from the cervical canal on another and examining with the microscope we can readily tell whether or not the spermatozoa reach the uterus. If it does not, then this case must be treated by surgical means, and the small os enlarged either by bougies, tents, forcible dilatation, or by incision, all of which is easy enough in the hands of the skilled practitioner.

Abnormal curvature of the cervix is a frequent cause of sterility and must be rectified. To accomplish this I much prefer the incision, especially where there is an acute anteflexion. The operation, as devised by my father, is one that has been much abused by the profession, but I think that in careful hands and in a certain class of cases the operation is capable of doing much good, and with due care is not so dangerous as some would have us believe. I have had pregnancy follow an antero-posterior incision of the cervix in a large proportion of my cases. I have practised it for many years now, and have yet to have my first accident. The mistake most operators have made after this operation for the relief of sterility is not to give sufficient attention to the character and condition of the secretions, which can so easily be revealed by the microscope. Hence the patient was supposed to be cured as soon as the operation was done, whereas the most important and tedious part of the treatment follows the operation. Sometimes it will be necessary to persevere with this after-treatment for months before the desired end will be obtained.

The most frequent of all the well-recognized causes of sterility is an abnormal condition of the secretions found in the utero-cervical canal. The mucus of the cervical canal, examined from the third to the fourth day after the cessation of menstruation, should be translucent, and as clear as the white of a new-laid egg, without any opaque or milky-looking specks in it. But even when it presents to the eye all the characteristics of the normal secretion, it may not be so.

The microscope alone can determine this point, and for this purpose it is necessary to remove a drop or two of mucus from the cervical canal with a suitable syringe a few hours after intercourse and place it under the microscope. If we find spermatozoa all dead or in a dying condition, then we know that there is some abnormal condition of the utero-cervical canal which gives rise to the abnormal secretion. A normal secretion is evidence of a healthy state of the secretory organ; an abnormal secretion is evidence of a deranged state of the apparatus producing it. We must then, in conditions of this sort, continue to investigate and treat the diseased utero-cervical canal till its mucous secretion is restored to a healthy state, which will be proven only when we find that it is favorable to the life of the zoösperms. This deranged state of the secretion in the utero-cervical canal is often found where the general health is perfect. But while it seems to be local, requiring local treatment, constitutional remedies must not be overlooked.

I have here spoken vaguely of the treatment in cases in which the secretions of the utero-cervical canal kill the spermatozoa. There is no specific treatment in such cases. If there is marked displacement, it should be at once rectified. I have again and again seen conception speedily follow the adjustment of a Hodge pessary in retroversion, and that without any other treatment than simply rectifying the malposition. To replace the uterus and hold it in position by a properly adjusted instrument relieves the obstructed circulation of the organ, thereby removing congestion, and often restoring the

secretions of the utero-cervical canal to a normal state, and then all is favorable for conception.

Sometimes it will be necessary to remove some small encysted tumor from the canal, or it may become necessary to remove fungoid granulations with the curette. The local application of various caustics, astringents, and iodine, or the tampon of glycerine or boro-glyceride answers a good purpose. Bougies, dilators, and the continuous use of the uterine stem will be valuable in appropriate cases. Endocervicitis must be remedied.

From rational signs after prolonged treatment, we may think our patient in a fit condition for conception, and be glad to get rid of the case—but we will certainly fall short of our whole duty if we dismiss her with the cervical secretions unfit to support spermatic life. As long as the cervical mucus kills the zoösperms we may be sure that there is diseased structure somewhere that produces abnormal secretions. And I cannot conscientiously discharge a case till I find living spermatozoa in abundance in the cervical canal from twelve to twenty-four hours after intercourse.

It is common to find acquired sterility follow a difficult labor or miscarriage. The patient and her family wonder why she has no more children. She is in perfect health, menstruation is normal, and she is not aware that she has leucorrhœa or any other evidence of uterine trouble—and thus years pass on and no other child is born. In the great majority of such cases the cause of the sterile condition is found in the vicious secretions of the utero-cervical canal. Some years ago, while living in San Francisco, the mother of two fine boys came to consult me in regard to her condition. She was then thirty-nine years old—had married at twenty-five and had her two children before she was thirty—but no conception afterward—when the children were respectively ten and twelve years of age they died within three months of each other. Three or four months after the death of the last child she consulted me to see if there was any hope of her having

more offspring. She was in good general health, strong and vigorous. But she was verging on to forty years of age and menstruation had been getting rather scanty. The uterus was in normal position and of normal size. The os had assumed the round virginal form often seen at the approach of the menopause, and the utero-cervical secretion was scanty and thick with white opaque specks in it. Of course, I knew at once this kind of secretion would kill spermatozoa, and that such a state of things had existed, no doubt, since the birth of her last child, ten years previously. A day or two after that I had an opportunity of proving that the spermatozoa entered the cervical canal in sufficient numbers, but that they were all dead. The advancing age, the declining menstruation, and the depressed mental condition of the patient were not favorable to conception. However, in three months the secretions were so much improved that living spermatozoa were found in the cervical mucus twelve hours after intercourse, and in two months more I found them thirty hours after it. Soon after this, conception occurred and another son was born. Now this was a very unpromising case treated with a scientific precision that could only have been accomplished with the microscope.

In speaking of abnormal secretions of the cervix such constitutional remedies as are necessary to restore the general health should not be overlooked. It is surprising how often we find this local vicious secretion in women who are otherwise in perfect health—and only remedies used locally to modify the secretory apparatus that gives rise to the abnormal secretion seem to have any effect.

To show how many causes may conspire in the same person to perpetuate a condition of sterility—the following case will suffice:

A lady, thirty-seven years old, had had one child who died when sixteen years old, and she became so despondent and melancholy as to cause alarm to her family. Some months afterward she consulted me as to the possibility of her having another child. Menstruation was normal in quantity and

quality, and her general health good. The uterus was retroflexed and much hypertrophied. The posterior wall and fundus were doubled back into Douglas's sac and felt to the touch like a tumor lying there. During her previous labor the cervix was lacerated down to the junction of the vagina, the lips were widely everted, and the cervical mucous membrane was hypertrophied, prolapsed, and congested, and there was a bad uterine catarrh. Here were three serious complications, any one of which was sufficient to cause the sterility —the retroflexion, the lacerated cervix, and the abnormal secretions of the utero-cervical canal. The first thing to do was to rectify the malposition and adjust a pessary to hold the uterus in its place. This alone was a very difficult thing to accomplish because there had been some laceration of the perineum—the sacrum was straight and the pelvis deep, and the pubic arch wide, and vagina enormous. However, I finally succeeded in fitting an instrument that held the uterus in position. The next step, and the easiest, was to perform Emmet's operation for repairing the lacerated cervix, which succeeded perfectly, as is always the case when properly done. The most tedious part of the treatment was that of restoring the secretions to a normal condition. The whole treatment took eight or nine months. I discharged her, and she went home. She missed her menstruation five months afterward. Two months later she came to New York for me to determine if she were pregnant—and such I found to be the case. This case shows how it is possible to overcome the obstacles to conception when we fully comprehend them. For without the practical application of the principles taught us by Hodge in the treatment of retroflexions, and without the beautiful method of repairing a lacerated cervix that Emmet has given us, and without the light shed by the microscope on the diagnosis and treatment of the abnormal secretions, as first taught by my father, Dr. J. Marion Sims, no result whatever could have been attained. No two of the principles just laid down would have led to success. All three were required, and not the least of the three was the microscope.

DISCUSSION.

The President.—Gentlemen, I feel myself at a loss to single out any member to open the discussion of this paper, so I will leave it to those who have experience and knowledge on the subject.

Dr. Fordyce Barker, of New York.—To start with, I will only say a few words in regard to a few incidental points, as the general truth of the paper will be accepted by all. Conception takes place in some cases as late as fifty, fifty-five, and, it has even been said, at sixty years of age. Some time ago I was called upon to give expert testimony in regard to a case in which this point was a very important one to settle, and we had some ten or twelve sessions. I studied up this subject very closely, and, in consequence, I wrote a paper, which was published some years ago, on "The Age in Women when Child-bearing Ceases." I investigated the matter very thoroughly, indeed, and I came to the conclusion, from my investigation of every supposed case, that the Biblical Sarah was the only one who ever conceived where there is any authentic record of it, after fifty-five; all the other cases rested upon such a basis as to be entirely void of value as proof. That some women do conceive at an advanced age, I know. In 1852, I was called in consultation to attend a lady who was fifty-two years old, and who was in labor for the first time. She was attended by a prominent obstetrician of New York, and had so difficult a labor that, after trying the forceps, I was sent for. I succeeded by delivering the patient by version after the forceps had failed to accomplish the purpose, delivering a living child. In ten months afterward I delivered her again, bringing on labor at seven and one-half months, as she had a contracted pelvis; and again fourteen months afterward, she was delivered of another child. That lady is nearly eighty-six years of age now, and has two daughters living. I believe she was fifty-two years old at the time of the first labor.

Another point in which I differ from Sir James Simpson, and which I have often had occasion to question, is his assertion that women who marry very late in life seldom conceive. I think

that assertion is too broad and too sweeping. In my practice, many women married after the age of forty years, I have attended in confinement. And incidentally bearing on this subject, I will say that, in women confined for the first time late in life, the impression generally with physicians, and with the public, is that labor is increased very much in danger. I see this often stated. My own statistics do not sustain this view at all, for I would rather attend a healthy woman of forty, than a very stout vigorous woman of eighteen or twenty. I think there is much less muscular resistance. The labor is of shorter duration and there is less resistance.

There is only one other point I thought of alluding to, which I will forego now, as I only rose to start the ball.

Dr. James B. Hunter, of New York.—I would like to say a word, in corroboration, in regard to the treatment of these cases. I have noticed that a greater number of cases have conceived in advanced life where gradual dilatation has been employed than where a sudden dilatation has been made.

Dr. H. P. C. Wilson, of Baltimore.—I can endorse Dr. Sims's remarks, having had a large experience in the treatment of dysmenorrhœa and sterility. I have used dilatation to overcome them, but have found that more conceptions follow division of the cervix backward, and the internal os backward and forward, than by all other means. And the point that Dr. Sims made, which I can heartily endorse, that the reason so many failures occur in properly selected cases to be treated for sterility, where there is contraction of the internal os, is, that after division of the cervix, and a free outlet had been made through the cervical canal and internal os for the discharge of the menses, and secretions that have been retained in the cavity of the uterus, and which set up inflammation there, we do not follow up the operation as we ought by treating the mucous membrane, which in all cases of sharp anteflexion, with dysmenorrhœa, is diseased. If we are content with doing the operation and letting the case rest there, and if we do not follow up the operation with treatment of the diseased mucous membrane of the cavity of the uterus, in the large majority of cases we will fail to cure the sterility.

Dr. A. W. Johnstone, of Danville, Ky.—The author, in enumerating the causes of sterility, has stated all those which the microscope can reveal, excepting one, and we can hardly say the microscope will always reveal this cause—the infantile uterus. The paper which I read last year was based upon a series of examinations of infantile uteri, in which I found in adult women a state of development of the girl of twelve or thirteen. I think these cases are absolutely sterile, no matter what you do for them. The causes I attempted to enumerate and to draw an analogy as being due to injuries of the pelvic sympathetic in the growing child, with arrested development, just as in any infantile development you may have infantile paralysis resulting in arrest. So in the study of our cases we will occasionally come across cases that are permanently sterile, which sterility is due to the infantile uterus. The case on which this paper was based was a splendidly developed woman, who had menstruated in a very irregular way up to thirty-nine years of age, and then sometimes there would be an interval of four or five years without any menstruation. The uterus was quite small as detected by physical examination, but it was impossible to tell whether she would become pregnant or not. The mere examination of the uterus would have told nothing. The passage and ovaries were all right, and probably the only power lacking was the power of making the placenta.

Dr. H. C. Coe, of New York.—The remarks suggest to me another point; a point that Dr. Sims hinted at, that these old constrictions or adhesions of the tube so obstruct the tube that the ovum is unable to get into the uterus. There is no means of arriving at a positive diagnosis, and sometimes they are mysterious. The spermatozoa are not killed by the cervical secretion, there is nothing the matter with the husband, and the cause is mysterious. Only last Monday I had a case of laparotomy, in which I found the tubes slightly distorted and obstructed from peritonitis. The patient had suffered for several years from sterility, and I was unable to get at the cause. I think sometimes at the post-mortem table and at operations we see an explanation of sterility which we have not been able to arrive at before.

Dr. A. J. C. Skene, of Brooklyn.—I will ask Dr. Johnstone a question in reference to this subject. I have observed clinically that which might correspond to his observations with the microscope, and the question I wish to ask is: Has Dr. Johnstone found in the senile atrophied uterus the same anatomical conditions which exist in the uterus of arrested development; and whether premature atrophy does not correspond anatomically with arrest of development? Because I have observed a change in the secretion of the mucous membrane of the adult in whom there was incomplete development of the mucous membrane; but whether it would show a microscopical difference in its properties I do not know. It is a peculiar secretion, more tenacious than normal, and it looks like the sputa of pneumonia. I should like very much to know if Dr. Johnstone's anatomical or histological investigations coincide with what I think I have seen clinically on this point. I ask the question with special interest because I am on record as making such observations.

Dr. Johnstone.—As to the comparative condition of the infantile uterus with that of the senile, they are not the same. The senile uterus produces true cicatricial tissue; there is almost none of the adenoid tissue, so we think of the senile uterus as true scar tissue. In the infantile uterus, however, we have a different kind of tissue, and the only way to express it is to say it is the same thing as the mucous thread that runs through a lymph gland.

In answer to Dr. Skene's second question, I would say the cause of the difference in secretions is due to the fact that there is a great deal more epithelium developed in the infantile than in the senile uterus, and that causes the difference of secretion.

The President.—The Chair will beg the indulgence of the Society to make a few remarks in connection with this subject before calling on Dr. Sims to close the discussion.

There are three points to which I desire briefly to call your attention.

The first of these points is one which I think has not been sufficiently brought out in any of our text-books, and, so far as I know, in any of our medical journals; I will state it briefly: That whereas we are taught in our text-books the average age at

which women reach the climacteric is about forty-five years; in my personal experience, which is corroborated by that of numbers of other reputable practitioners throughout the South, in my region of country, it is more correct to state that rule at fifty rather than at forty-five. And I think I could easily instance two women at least who have continued to menstruate long after the age of fifty. A woman regularly menstruating at the age of fifty-five is not at all anomalous in the Southern States of America.

The second point is in reference to the extreme age at which conception may take place, and I would simply remark that I have an authentic case in my own family, in the person of my grandmother, who conceived at the age of fifty-five, and was delivered at fifty-six; and that uncle is now living. Another point, and more *a propos* to the paper of Dr. Sims, is in reference to the etiology of barrenness. I recollect a very curious case of a young lady, some five or seven years married, who came to me for the express purpose of searching out, if possible, the cause of her barrenness. A thorough search of that case led to the determination that the only possible cause of her barrenness was a want of development of the anterior wall of the vagina, and an excessive development of the posterior wall by which the os uteri was situated high up and immediately behind the arch of the pubes, leaving a deep posterior vaginal pouch. You will readily see the difficulties of the case. I dismissed her and took the husband in hand, and gave him a brief talk on the science of mechanics, and the result was that pregnancy of the wife was announced later on, and everything went on smoothly. She was absolutely healthy except the malformation I speak of. I think this is rather a unique case.

Dr. C. Kollock, of South Carolina: I think it would be safer to establish the average at fifty. I have in my mind two cases, both relatives—first cousins. One delivered her youngest child at the age of fifty-three years and four months; the other sister delivered at just fifty-three years. Dr. Bard, the author of one of the first works on obstetrics, mentions the name of a highly respectable lady, the mother of twenty-two children, none of whom were twins, who gave birth to the last child at the age of sixty-two years and eight months.

Dr. Sims.—I do not know as there is anything more to say on the subject. I would say to Dr. Johnstone, however, that the reason I did not speak of the non-developed or infantile uterus was that I thought that cases of that kind would come under the head of sterility, but not being the kind that I would class under the treatment with the microscope. I therefore left them out. This condition in married women I frequently treat with galvanism, electricity, etc.

I was very glad to hear Dr. Wilson and Dr. Hunter say they had such good results follow the operation for division of the cervix, because it was one devised so many years ago by my father, Dr. Sims. At the time he brought out the operation the medical journals and societies and medical men in general pitched into him for dividing so many cervices. Even in Europe he was treated in the same manner; and finally it got to be an operation which was run into the ground. Like all good things which are devised and spring from the brain of good men, it was abused by some over-assiduous followers of Sims, which brought the operation into disrepute with the profession at large. But as an operation for the relief of a certain class of dysmenorrhœa and sterility, I have practised it for seventeen years, and I do not think it is fraught with danger when it is carefully done, and I think it is capable of doing a great deal of good especially in severe dysmenorrhœa and such cases of sterility as I have related here this morning.

The great mistake made formerly by followers of Sims in treating a case by this operation, has been that they have not followed the case with sufficient care, nor given sufficient attention to the minutiæ of the operation. I hear of deaths from it, which if traced to the origin of the trouble, would be found to be due to some unfavorable attending influence, such as allowing the patient to walk home, or go home in a carriage or railroad car, after the operation. These are the cases which almost always have hemorrhages and inflammatory disease of the pelvis or the uterus. It is always the abuse of the operation rather than the mere operation itself which causes so much after-trouble.

In the vast number of cases of sterility which I have treated in the last fourteen or fifteen years I have had most excellent results from curetting the canal as well as the intrauterine in-

cision. I do not let the patients get up even to use the commode, but keep them flat on their backs after doing the operation. I put in a rubber stem, after using the dilator, which stops all hemorrhage. I have not had a case of hemorrhage following this operation in ten years, and simply because the plug stops it so tight, and the cotton keeps it so firmly in position that hemorrhage is almost impossible.

THE INFLUENCE OF PREGNANCY ON PELVIC DISEASES.

By James B. Hunter, M.D.,
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There is a popular opinion extant, probably reflected from the professional opinion of a past generation, to the effect that pregnancy is a possible remedy for many of the diseases from which women, especially young women, suffer. For the lack of other remedies this may perhaps have been adopted as a last resort. On the other hand, it is not uncommon to hear patients say that they have been advised, professionally, to avoid pregnancy, as likely to develop some latent tendency to disease. This question of the connection between pregnancy and disease is a comprehensive and interesting one, and is often of deep practical interest, as, for instance, when advice is sought as to marriage. The welfare and happiness of a lifetime may depend on the advice given in such cases. The popular opinion is just as likely to be wrong as right, but there can be no doubt that pregnancy has a very marked influence on some forms of pelvic disease; and it may be worth while to consider the question somewhat in detail, the question being, the influence of normal pregnancy on disease, without reference to the influence of disease on pregnancy.

Before taking up separately the various diseases with which the subject brings us face to face, we may simply refer to the fact that pregnancy substitutes a permanent for a periodic, or rhythmic, congestion of the pelvic organs; and that, as certain forms of pelvic disease are aggravated by the menstrual congestion, it is reasonable to suppose the same diseases to be

unfavorably influenced, in a greater degree, by the congestion of the pregnant state, which is known to cause a profound change in both the vascular and nervous systems. In the earlier months of pregnancy the function of nutrition is often seriously interfered with through the nervous system, while in the latter months the digestive organs are greatly interfered with by pressure, the influence being purely mechanical. It is, therefore, not to be wondered at, that a condition making so severe and prolonged an impression on the system in health, should exert a correspondingly profound impression in case of disease.

While basing any opinions which I may express on this subject on the observation and record of a large number of clinical facts, the limits of the paper and, perhaps, of the patience of my hearers, will not admit of the presentation of cases in detail.

To begin with the external organs, all diseases of the vulva and anus are unquestionably aggravated during pregnancy. A very slight degree of *pruritus vulvæ* will often become exceedingly troublesome at that time, in part from the cervical discharge, and in part from obstructed circulation, and consequent venous congestion. There is a difference of opinion as to the influence of pregnancy on vegetations on the vulva, especially those of venereal origin; but the weight of evidence is in favor of their increased growth at that time. My own experience of such cases is not large, but, in several, there has been no appreciable change. Malignant disease of the vulva, as a primary affection, is rare, and few cases have been observed during pregnancy. It would probably be aggravated, and progress rapidly, as does malignant disease elsewhere; yet I happen to have observed one case of well-marked primary carcinoma of the vulva on which pregnancy had no effect whatever. Inflammation of the vulvo-vaginal glands, from occlusion of the ducts, is aggravated during pregnancy. The frequent occurrence of hemorrhoids during pregnancy gives

striking proof of the influence of long-continued venous congestion on the pelvic organs generally.

Lacerations of the perineum, if complete, are generally rendered worse, the rent in the vagino-rectal septum extending upward, and subinvolution of the entire vagina remaining. Cases of incomplete rupture of the perineum are not usually aggravated, if the head of the child is not larger than that of the one preceding, and if there are no complications. There is, however, a greater tendency after each parturition to prolapse of the posterior wall of the vagina. The effect of delivery on a perineum which has been repaired by a superficial, imperfect operation, is to leave the last condition of the patient worse than the first. After a thorough operation, with perfect result, and the lapse of time enough, a normal delivery, carefully conducted, will not injure the perineum, unless the head be very large.

Diseases of the vagina are subject to the same influence, and take usually the same course, as diseases of the vulva. Cysts of the vagina sometimes grow more rapidly then than at other times. Later, they may be subject to severe pressure, and, during delivery, they may rupture. Prolapse of the anterior wall of the vagina may be much aggravated by pregnancy, and the condition may remain after delivery. The bladder also may be subjected to injurious pressure, and there may result either cystitis or a prolapse of the urethra, or both. Vesical calculi do not grow more rapidly, but they are liable to cause more injury to the bladder, through compression or traction, during or before delivery ; and under some circumstances lithotomy may be rendered necessary. A vaginal enterocele may become strangulated under similar circumstances. Malignant disease of the vaginal wall, whether primary or secondary, is likely to increase with alarming rapidity after conception has taken place.

Diseases of the cervix, as lacerations, erosions, and ectropia, are constantly observed to undergo serious aggravations during the first three months of pregnancy; but after that they are

not easily observed, owing to the changed position of the parts, and they may even seem to disappear as the cervix gradually expands and thins out. As a rule, a case of lacerated cervix three months after delivery, provided no fresh injury has taken place, will not be found to have changed materially. Charpentier and Cazeaux believe that erosions of the cervix become worse during pregnancy. Induration in the angle of the wound in a case of lacerated cervix does not disappear during pregnancy, and may often be felt in the substance of the softened cervical tissue. Malignant disease of the cervix does undoubtedly often receive a stimulus from pregnancy, and begins to grow with astonishing rapidity, so that within a few months the new growth may fill the vagina. I have had occasion to amputate the cervix in two such cases before delivery could be effected. In one of these, a high amputation had been performed three years previously, and the patient was supposed to have been cured. After becoming pregnant there was a recurrence of the disease. Charpentier mentions cases in which epithelioma of the cervix progressed so rapidly during pregnancy as to render a Cæsarean section necessary to effect delivery. Hofmeyer considers pregnancy a very serious danger in cases of cancer of the neck. There seems to be good reason for believing, in the absence of positive proof, that in case of laceration of the cervix, with much hypertrophy and rolling out of the tissues, each additional pregnancy enhances the danger of subsequent epithelioma. Where there is a tendency to malignant disease pregnancy probably increases the liability to its development. Certain it is that many of the cases of epithelioma of the cervix give a history of an unusually large number of pregnancies. Emmet (*Principles and Practice of Gynecology*, p. 509) says of cancer of the uterus: "The average number of children borne by these women is always much above the usual one." This statement, though too sweeping, is significant, as the opinion of a very accurate clinical observer, who believes also that "nearly all, if not all, cases of epithelioma, or cauliflower

growth, have their exciting cause or origin in a laceration of the cervix," and may appear either after a recent laceration, or not until after the menopause. The point in question is, whether, in a given case of laceration of the cervix, pregnancy is a dangerous event. The conditions are so different in different cases, that the question cannot be answered by a monosyllable. The first child may have been very large, or instruments may have been used. The resulting laceration would not be increased if subsequently the woman were delivered of smaller children. But though the lesion might not be extended, the influence of parturition would still be detrimental, favoring subsequent hypertrophy and induration. In another class of cases the later deliveries might be most severe, and greater injury would result. Yet another class of cases consists of those in which a lacerated cervix has been closed by operation. If sufficient time has elapsed since the operation, and a perfect result has been obtained, the condition cannot be considered a pathological one; but it may be remarked in passing that in such cases pregnancy does not necessarily cause any bad effects whatever. If a laceration should occur, it is not apt to be in the site of the cicatrix, which yields and dilates quite as readily as any other portion of the cervix. If, however, pregnancy should occur soon after an operation on the cervix, before the uterus, if subinvoluted, had diminished in size, the reparative process would certainly be arrested, and no ultimate good result could be expected from the operation. I have observed, in a number of cases, that after pregnancy had taken place, the large and indurated lacerated cervix became soft; and that, after delivery, there was a temporary improvement, the cervix remaining in better condition, provided involution took place, but afterward assuming its former size and other characteristics of chronic laceration.

All affections of the body of the uterus, especially flexions and versions, are liable to fluctuations during pregnancy. In cases of congenital anteflexion pregnancy is not likely to occur; but, if it does, it generally results in a cure of the

dysmenorrhœa, though the flexion may remain, in a less degree. This is one of the few uterine disorders likely to be cured by pregnancy; but, as it is a condition accompanied by severe pain, the cure has therefore been considered remarkable, and has led to exaggerated notions of the influence of pregnancy in conditions radically different. Retroflexion, or marked retroversion, does not always prevent pregnancy; but if it occurs the patient is likely, unless carefully managed, to miscarry, and the uterus may suffer in consequence. In retroversion with adhesions, the effect of pregnancy is sometimes to leave the uterus, after involution, perfectly movable, and thus to effect a cure. In case, however, displacements of any kind result in abortion, as they are likely to do, there is not only no curative influence whatever, but rather the reverse, involution taking place imperfectly, and a state of passive congestion remaining. In such cases, a displacement is aggravated, new adhesions are apt to form, and the uterus may be left, for a time, immovable. Inflammation of the utero-sacral ligaments is one of the evil results which may follow abortion. A normal pregnancy going to full term, whatever may have been the previous position of the uterus, is more likely to do good than harm, while an abortion has often serious consequences.

Fibroid or other tumors, in the wall of the uterus or in its cavity, do not remain passive during pregnancy. They either undergo change themselves, or they provoke contractions of the uterus, and force it to expel its contents. Small tumors may become atrophied; but where this change is supposed to occur the symptoms are often due to a flattening of the tumor, or to its displacement, so that it cannot be detected. Such tumors may undergo fatty degeneration, but their behavior depends much upon their situation, and the amount of pressure to which they are subjected. As a rule, the more sessile the tumor, and the broader its base, the more closely will it sympathize with the physiological changes in the uterus. Subperitoneal fibroids, if small, are not materially

affected by pregnancy. If connective tissue predominates over muscular tissue in the tumor, the change will be less marked. The tumors usually increase in size, becoming more vascular and active. Hemorrhages may occur into the substance of the tumor, as a consequence. Small tumors, so situated as to be subject to pressure, sometimes disappear during pregnancy, and reappear afterward. In soft, rapidly growing tumors, there is often a sudden and great increase in vascularity, and, consequently, in size, during the first six months. This is not the case, however, with pediculated fibroid tumors, which are not especially affected by pregnancy, unless large enough to interfere with the growth of the uterus. After pregnancy fibroid growths sometimes seem to partake of the process of involution, and diminish in size. This reduction is due, in part, to the contraction of the muscular fibres of the uterus, and in part also to the diminished blood supply. (Gusserow.)

Enlargement of the uterus, as from subinvolution, is sometimes cured by pregnancy and the puerperal state. The uterus may even under these conditions become smaller than it should be (superinvolution, Simpson). As a rule, however, pregnancy tends rather to increase the amount of "areolar hyperplasia," and thus to leave the uterus larger than before impregnation. This would be especially true if there were any septic complication following delivery, or if there were any laceration of the cervix. Involution is sometimes prevented by the existence of a fibroid tumor. Cases of subinvolution which have been cured by local treatment do not, as a rule, recur after a subsequent pregnancy, provided the cervix has been restored to its normal condition, and no extensive injury is done to it by a later delivery.

The canal of the uterus is subject to the greatest danger during gestation, if any disease exists. Endometritis with fungosities does not prevent impregnation, but is usually worse after either miscarriage or delivery at full term. Small polypoid growths are not usually cured, as might be expected, but remain in about the same condition after pregnancy as before.

They may give rise to troublesome hemorrhage, which sometimes simulates that of placenta prævia. They may also cause severe hemorrhage after delivery, by a sudden increase of vascularity when the uterus is empty.

Septic endometritis following abortion may lead directly to disease of the tubes. While salpingitis is often due to this cause, Winckel (*Diseases of Women*) and Henning (*Diseases of Tubes*) state that, in consequence of the introduction of a septic element in this way, a harmless hydrosalpinx may become a serious or fatal pyosalpinx; or a simple catarrh may be transformed into a purulent inflammation. Rupture of a distended tube may result from pregnancy, the tubes being liable, in the first place, to diseased action, and, in the second place, to abnormal pressure. Moreover, the enlargement and ascent of the uterus in early pregnancy may cause traction on imprisoned appendages, thus leading to rupture, and localized or general peritonitis. The ovaries may be displaced during pregnancy, and may become enlarged or inflamed in consequence, and slight adhesions may then form, rendering permanent the displacement. All writers agree in believing that pregnancy leads to a common form of prolapse of the ovaries, from relaxation of the infundibulo-pelvic and broad ligaments, which do not regain their normal tone after delivery, especially if involution is imperfect.

Ovarian tumors often coexist with pregnancy, which may run its full course, leaving the cyst in the same condition as before. There is, however, a liability to rupture from pressure, of which there are many cases on record. It is also very probable that ovarian tumors are liable to contract adhesions during pregnancy, rendering the subsequent management of them more difficult. The coexistence of pregnancy and ovarian cysts renders the diagnosis difficult and perplexing. In one case which I have seen quite lately, a miscarriage at the third month, accompanied by severe septic symptoms, was complicated with a large adherent ovarian cyst on one side, and a smaller parovarian cyst on the other. Hemorrhage

had taken place into the ovarian sac, which, in some parts, was so thin that it could not have borne the pressure had the uterus continued to enlarge. The patient was cured by operation. As a rule, ovarian cysts grow a little faster during pregnancy than at other times, following the natural course of morbid growths when their blood supply is increased. This accounts for the fact that cysts of considerable size rise out of the pelvis in such a mysterious way after delivery. They had been present before impregnation, but had been so small as to be intrapelvic, and had therefore escaped notice.

The recorded cases of pregnancy in connection with ovarian disease are curious, and show that fecundation may occur where there is marked cystic disease of both ovaries. Holst reports a case (*Beiträg. Gynecol.*, 1867, Heft ii. p. 166) in which the patient had a dermoid cyst of one ovary, and an advanced medullary cancer of the other. Hofer describes the case of a patient having double dermoid cysts, who, several years later, became pregnant and was delivered with forceps; death resulted, and the autopsy showed that the degenerative changes were set up in the tumor as a result of pregnancy. Hewlett (*Med.-Chirurg. Trans.*, 1832, vol. xvii. p. 226) found a case of cancer of both ovaries in a patient dying during the puerperal period. A similar case is reported by Lachapelle (*Prac. Accouchements*, tome iii. p. 383). These cases, of course, do not prove the existence of the disease of the ovaries at the time of conception, and should rather be taken as evidence of the exceedingly rapid development of ovarian diseases under certain stimuli, especially that of malignant disease. Spiegelberg reports two cases, in the first of which the patient died nine days after delivery, from peritonitis due to rupture of an ovarian cyst. Both ovaries were found to be converted into cysto-sarcomata. The second patient died four weeks after the birth of her eleventh child, and both ovaries were found to consist of tumors as large as a fœtal head. "As a matter of course," says Olshausen, "the extent of ovarian disease at the time of conception must be a matter of doubt in

all these cases, but it is also absolutely certain that the disease had at least begun on both sides, and had perhaps involved the entire organ." Olshausen believes that ovarian tumors increase in size during pregnancy, and remarks that "the same fact has been observed in regard to other tumors of the vulva, as well as myoma and cancer of the uterus." Lücke (*Monatsschrift für Geburtshülfe*, p. 261, 1862) calls attention to the fact that malignant tumors in all parts of the body grow faster in pregnant women. Wernich believes that pregnancy favors the change of benign into malignant tumors. Among 165 cases of ovarian cysts in pregnant women noted by Jetter, 31 were dermoid cysts. Dermoid tumors, as a rule, grow slowly, and remain in the pelvis longer than any other cysts, and are, therefore, more likely to be injuriously affected by pregnancy and parturition.

Among the dangers to ovarian tumors from pregnancy, are rupture or suppuration of the cyst, hemorrhage into it from pressure, torsion of the pedicle, and peritonitis from the separation of adhesions. Abortion is to be considered as one of the secondary results. It occurred in 36 out of 215 pregnancies, in 165 cases observed by Jetter, but he remarks that "one or more abortions were very often followed by pregnancies of normal duration." This would make it appear that the size of the tumor had no direct effect in causing abortion, as the cysts were probably larger in the second pregnancy than in the first. Of the 215 patients, 64 died. Of 56 patients, whose cases are reported by Litzman, 24 died. I have myself seen one case in which an ovarian cyst ruptured into the rectum during pregnancy, and discharged its contents in that way; and cases are recorded in which cysts have ruptured into the bladder or vagina.

The evil results of pregnancy as regards ovarian tumors increase with the advance of pregnancy, while the dangers as regards parametritis are chiefly confined to the earlier months. If a patient passes the third month, she is not likely to abort

afterward as a consequence of cellulitis, since the adhesions then soften down, yield, or disappear.

The effect of pregnancy on parovarian cysts may be the same as on ovarian tumors—it may cause rupture. The contents of these cysts, however, are not so likely to prove harmful, and small tumors of this kind may disappear during the enlargement of the uterus, and never refill. The rupture of a dilated tube, filled with either pus or blood, is liable to occur during pregnancy, and with most disastrous result.

The occurrence of extra-uterine pregnancy, where the fœtus is destroyed or dies spontaneously, leaves a condition of the tube that, in the event of a subsequent normal pregnancy, may result in inflammation in the site of the former disease. Disease of the tubes from any cause, while it does not prevent impregnation, is very liable to be aggravated by pregnancy. It is important, in this connection, to distinguish between the effect of pregnancy on diseased tubes, and its effect where there is simple, uncomplicated parametritis. In the former case, the disease is almost invariably aggravated; while in the latter, if the patient does not miscarry, the ultimate results may be rather beneficial than the reverse. There is likely, however, where adhesions exist, as in old parametritis, to be severe pain as the uterus enlarges, sometimes so severe as to necessitate the induction of abortion. This pain may closely simulate that of extra-uterine pregnancy, but it is more constant, less agonizing, and is not attended with symptoms of collapse.

In simple ovaritis, symptoms which are quite mild and tolerable become suddenly aggravated when pregnancy occurs, and may subside again after delivery. This condition may occur in several successive pregnancies, as in one case of which I have full notes. The fact that simple hyperæmia of the ovaries or tubes may result in inflammation during the congestion of pregnancy is significant. It must, however, be remembered that during this condition the ovaries enjoy a functional rest, which must be taken into account in consider-

ing its results. One of the means by which inflammation of the tubes is inaugurated is by the extension of septic infection from the uterus, as in cases of abortion. This may lead to localized or general peritonitis, beginning, perhaps, as a perisalpingitis. The course pursued by para-uterine inflammation, consequent on pregnancy, is by no means uniform. As a result of laceration of the cervix, inflammation at the basis of the broad ligaments is common, with the subsequent formation of bands or nodules. As a result of infection, the upper portion of the broad ligaments is more likely to be affected, and later, the utero-sacral ligaments. Each depends on the stage at which the pregnancy ceases. There is a much greater liability to parametric inflammation after an abortion than after a normal delivery.

On a review of the subject thus hastily sketched, it will be seen that it falls naturally under two heads:

I. The effect on pelvic diseases of pregnancy going to full term.

II. The effect of abortion.

These effects may again be all classed as either mechanical or septic.

It would have been practicable to consider the subject chronologically, giving the effects on disease of pregnancy in all its stages, but that method seemed likely to lead to a more voluminous paper, while, for the end in view, the present plan will, I think, prove sufficient. I am well aware that the subject has not been exhaustively or completely set forth, but enough has been said to direct attention to an important question, and perhaps to stimulate the observation and record of facts bearing on it.

In a small class of diseases, notably anteflexion, fibroid tumors of moderate size, sessile or mural, and in the induration resulting from parametritis, and perhaps in subinvolution, pregnancy may be of benefit, and need not be regarded with apprehension.

In a large class of diseases, including all forms of malig-

nant disease, all the inflammations of the uterus, tubes, and ovaries, in ovarian or parovarian tumors, in pyosalpinx or hematosalpinx, in hematocele, in local peritonitis of any degree, and in all intra-uterine growths, pregnancy must be regarded solely as an evil, and as exposing the patient to serious risk of life and health.

In trifling pelvic diseases, as slight flexions or versions, a mild degree of endometritis, or catarrhal disease of the cervix, the occurrence of pregnancy may he regarded with indifference. Unmarried women often have a morbid dread of assuming the duties of matrimony if they are suffering from any uterine disease whatever, and are apt to exaggerate the importance of slight ailments as a bar to the married state. Positive advice against marrying, on account of pelvic disorders, should never be given without a very careful physical examination, and then only if there is a decided probability that the result of pregnancy may be disastrous.

DISCUSSION.

Dr. A. J. C. Skene, of Brooklyn.—Knowing Dr. Hunter of old as I do, I know that it is always very difficult to discuss his papers, because he does not give us any chance by leaving much to be said. And yet, he encourages one to say something, because his results are such as one earnestly engaged in practice may hope to imitate, and there are some points in the paper which I wish to mention, more in the way of stating that they have agreed with my observation, perhaps, than adding anything new.

The subject is one of extreme interest, because the question frequently comes before the practitioner as to what is the effect of utero-gestation upon the existing affection or pelvic disease in a given case, and, I think, he should be prepared to give the best possible advice under the circumstances.

I might call attention to the influence of pregrancy upon general malnutrition, due to various causes. We have often noticed that rather delicate subjects after bearing children become very much more robust; such cases usually menstruating

with difficulty, and after bearing children they are very much improved in that respect, showing that in many cases, at least, utero-gestation has a decided influence for good on the general nutrition. In this connection, I am sure it has, as Dr. Hunter has pointed out, a very beneficial influence in completing the recovery from some forms of displacement. It will be seen, I think, why this is so: if I am right in stating that the general nutrition is often improved by pregnancy. Taking the ground that anteflexion of the uterus is a condition of malformation, or arrest of development and growth, and that it is very often aggravated by a condition of malnutrition, then we can readily see why utero-gestation would bring about recovery. Supposing that a case of anteflexion has improved under treatment sufficiently to become pregnant, then we may hope to secure a complete recovery from this arrested development. I have seen in this respect great benefit from utero-gestation, and, I think, that it may, in such cases, be looked upon as a therapeutic agent of great value.

In relation to by-gone inflammations of the pelvis, or old adhesions from peritonitis and salpingitis, or inflammation of the ovary on one side, I have seen very bad results from pregnancy in some cases, and very good results in others. On the whole, if I decide upon my own observations I would say, in cases of old pelvic inflammation, that the benefit to be derived from utero-gestation more than counter-balances the risks and troubles likely to occur, as pointed out by Dr. Hunter.

Some time ago I had a lady patient who had, in her early life soon after marriage, a marked inflammation which I then called pelvic cellulitis—I would now call it pelvic peritonitis; she had marked adhesions on one side, while the other side was well. She suffered intensely from recurrent attacks of local inflammation on that side; she miscarried at the third month. She again became pregnant, and again was dangerously ill, but was delivered at the sixth month and made a good recovery; later on still she became pregnant again, and gave birth to a child at term, proving that even in desperate cases there is a chance.

In reference to displacements of the uterus, in case gestation occurs there is need of careful management of such cases, as

Dr. Hewitt has pointed out. I think the majority of them would not miscarry if they were properly cared for. If they go on to full term and are properly managed post-partum, I think their tendency is to complete recovery. If they are left alone during confinement, I think the tendency is for the original amount of displacement to recur, and especially if that displacement is due to subinvolution of the supports of the uterus, as it often is. It is not so with flexion, either anteflexion or retroflexion; with anything like proper care after confinement, I think the recovery will be complete.

With reference to certain conditions of the ovaries, I have watched with great interest the effect of pregnancy upon hyperæmic states of the ovaries and prolapsus of the ovaries. I believe nearly always in prolapsus of the ovaries the trouble recurs after confinement. In some cases I have suggested to the patient that there was a strong chance of recovery in ovarian displacement. I have watched this point carefully, and I honestly claim to have been one of the first to point out the prolapsus of the ovary as a common affection, and to call attention to its symptomatology, physiology, causation, and diagnosis. If the patient becomes pregnant and that cures the trouble, we need not interfere. In my cases it has occurred again. Cases becoming pregnant, which have been attended by their family physician, have come back to me, and I have verified the diagnosis of prolapsus of the same ovary. And so, I think, it is doubtful whether we may expect so much from utero-gestation in that affection.

That inflammation of the ovaries is likely to be aggravated by gestation has not been quite my experience, but, perhaps, I have not been so careful an observer as Dr. Hunter.

Dr. Bache McE. Emmet, of New York.—Although I agree with Dr. Hunter, in general, there is one point on which I must take issue with him. In the cases of uterine disease which pass for mild, and yet which sometimes have an extremely serious result, if we allow pregnancy to be established, we provoke further trouble and promote ill. My experience is, the same as has been pointed out by others, that the benefits to be derived from pregnancy in the cases of local pelvic inflammation, in which it can be brought about are, that it affords quiet to the

parts involved, and allows them to recover. But where we have conditions in which we see one miscarriage after another, if the trouble which predisposes to them is not checked the same thing will go on for years, and the patient is constantly the subject of disease, and yet not enough immediately to make her leave work or complain; but coming under observation, we discover, in most all of these cases, a history of some pelvic disease, and we find some uterine catarrh. If such a case be not well looked to, we may pass over the real condition; but if a thorough internal examination be made, if we are anything of a specialist, we will detect that which would escape the general practitioner. The external os and the outer portion of the cervix may seem to be normal and the walls are in good shape at the lower inner portion also, but passing further up into the canal, and handling a probe, we find that it moves freely about—in a pocket, in which the discharge which shows at the lower os is collected. Here we have an internal or concealed location, and the diseased glands being exposed and constantly irritated by their over-discharge, are much enlarged and bleed on the slightest provocation. I think that in these cases, which are apparently of so slight consequence, we should discourage pregnancy until the patient has been under treatment—even surgical treatment—to restore the parts to a normal condition. In many cases there will be injury only of the extreme upper part of the cervix, in the region of the ring of Bandl, and many women will go on carrying one child after another without any trouble. But there are many others of a more sensitive organization, who will repeatedly miscarry, and unless such an injury is looked for, the reason of the mishap will pass unnoticed. My remarks are intended particularly to call attention to the necessity of a thorough examination of the interior parts of the uterine canal, although externally everything may apparently be all right. In the majority of these cases pregnancy will terminate in the third or fourth month, and though it may go to a more advanced stage, the same result will almost surely follow.

There is one other point I wish to call attention to, and that is, the great benefit which is to be derived from pregnancy in some cases of chronic subinvolution, which are very unmanageable

because of the consequent displacement. In these cases the malposition results from weight, rather than from inflammatory products in the neighborhood of the uterus, and such cases of enlargement as resist every other form of treatment I have seen markedly benefited from encouraging the patient to become pregnant. Although attended with a great amount of uterine discharge, we realize that it is often possible, by using care, to clear out the canal, and we can sometimes leave it in such condition that fructification can take place. I have seen such marked results follow this method that I am quite confident, if the uterus is made to contract properly after delivery, and if careful asepsis is carried out, we can have the organ restored almost to its normal condition, and thus overcome such displacements as may have attended it.

It is the most natural method, and is surely to be preferred to that mentioned in the paper which is about to be read, namely, the removal of the appendages, though I presume I am not entitled to criticise it in advance.

Dr. Cameron, of Montreal.—It may possibly be of interest to the Society to have me recount a couple of cases from my practice.

In studying the morbid conditions which may attend pregnancy, we should endeavor to distinguish between the effect of pregnancy upon fibroid tumors, and the effect of fibroids upon pregnancy. In 1877, in our pavilion, we saw a case which was rather unique. A woman was brought in in active labor. She had been in labor for forty-eight hours, and the labor terminated without any instrumental interference. After its termination there came about a difference of opinion among those present: whether there was not a second fœtus in utero. Examination revealed nothing present; but upon palpation, a large mass was found presenting, the size of a small fœtal head, undergoing a rapid movement, and also a number of small masses like the limbs of the child. This was so deceptive that we resorted to auscultation to find the heart of the fœtus. When the placenta came away five subperitoneal fibroids were discovered, the movements that had simulated those of a child being produced by the irregular contractions of the uterus, causing a movement

of the fibroids in different directions. The patient made a good convalescence, and at the end of two months menstruated, when she was discharged. The fibroids diminished until none of them could be distinctly made out. She had had a previous pregnancy, and has had a subsequent one.

The second case is of special interest, as it bears somewhat on the very interesting paper upon "Ureteritis," presented by Dr. Kelly. This patient was seen by me after having been a long time in labor. She was a small woman and had a rachitic pelvis with a diameter of three inches. It was still too far off to turn, and too much extended to think of section, so the only resource was the high forceps operation. We found she had been delivered of a child by forceps by Dr. Alexander, of Liverpool, some three or four years previous, with great difficulty, and that after that time she had had a very long recovery, having spent from four to five months in the hospital, three or four of them having been spent in bed. We afterward ascertained the symptoms, which, had we known them before, and had she been under observation before, we would have been aware of the existence of ureteritis. The high forceps operation was performed, and after a great deal of difficulty a child of very large size was safely delivered alive. She seemed fairly comfortable afterward, but we had to empty the bladder with a catheter. At the expiration of forty-eight hours her water began to drop away, and I thought a fistula existed, but a careful examination failed to detect where it came from or where the fistula was situated. She convalesced on the twelfth day, was free from high temperature, and was doing fairly well. Shortly after, however, uræmic symptoms occurred, and she succumbed very rapidly. At the post-mortem we found all the pelvic viscera connected together by old pelvic inflammation. The left ureter was as large as one's little finger; the left kidney was diseased, and the ureter was ruptured at a point midway below the kidney. The water had come through the ruptured ureter into the lower segment of the uterus, thus finding its way out. This accident, evidently, occurred through the force of traction on those parts which had become friable, and in that manner rendered easily to be torn. The case will be published shortly with figures, measurements, etc. It is an

interesting case, and, I think, a unique one, and so far I have not discovered any literature in reference to this subject. Probably as the result of the old pelvic trouble, this ureteritis was set up, with partial destruction of the kidney, so that another pregnancy caused this trouble.

Dr. Hunter.—I am glad Dr. Skene agrees with me in general as to the inflammation of the pelvic organs. He has very ably elaborated the ideas I had presented rather imperfectly. I quite agree with Dr. Emmet, that where there is much disease it is highly important to treat that disease before permitting a second pregnancy, particularly where there has been a number of miscarriages. Dr. Cameron's first case is almost parallel to one which I reported some years ago, in which I delivered a woman of a child, and found remaining three fibroid tumors. No hemorrhage occurred, and the woman made a good recovery.

ELECTRO-THERAPY AND SURGERY IN GYNECOLOGY.

By George J. Engelmann, M.D.,
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Within the last two years, since the reading of my first paper on this subject at the Baltimore meeting of this Society the general interest in gynecological electro-therapy has constantly increased, and many have resorted to the use of the current in gynecological practice; but I fear that much disappointment has been experienced, as too much has been claimed by enthusiastic advocates, so that those who hastily endeavored to utilize the new remedy have been more or less disappointed, and now rashly condemn it. But they have failed, not because the agent is an impotent one, but because it is as yet too often applied with imperfect apparatus, and indiscriminately, without a strict knowledge of the conditions under which it might be effectually used. The agent is applied at random, with a vague hope of success, without reference to properly formulated indications, based upon pathological considerations by which the practitioner justifies the administration of other remedies.

For myself, I will say that the new remedy has proven all that we might reasonably expect. I am thoroughly satisfied; although I have not been able to achieve results so brilliant, in all cases of large uterine tumors, as those claimed by Apostoli, by the Keiths, or by my respected colleague, Dr. Baker, this very failure has served me to gain a more

thorough knowledge of the agent; all such tumors are not fit subjects for this treatment—and I now thoroughly appreciate the cause of my failures—failures to cure, not failures to relieve: failures, if you may so call them, which are due to the structure of the growth in the individual case. In former years, I, myself, have applied the current, as most operators still do, indiscriminately, in such cases of uterine tumor as were either inoperable or refused operation. Thus, I fell into the common error of indiscriminate electro-therapy, and, of course, treated many cases in which reduction was simply impossible. By apparently peculiar variation of failure and success, I was taught to discriminate, and soon saw that this remedy, like all others, must be selected for the individual case.

Hitherto we have been groping in the dark; the treatment has been applied without indications, other than the convenience of patient or practitioner, to fibroid, myoma, or sarcoma, intramural or subperitoneal, in rapid growth or in cystic degeneration: hence the variety and vagueness of reports, an evidence of the uncertain status of electro-therapy, which must persist until the present wide field of application is defined and limited, and the practitioner proceeds, as with other methods, only after a thorough sifting of the case, and the determination not to resort to the treatment until correct indications can be established. With increased experience and discrimination the record constantly improves, and the good results which I have obtained of late under rather unfavorable circumstances afford most satisfactory evidence of the value of the electric current as a therapeutic agent.

During a long period of painful inactivity, away from home, I have been enabled, by the courtesy of foreign *confrères*, who kindly placed at my disposal suitable cases, to verify many of the results previously obtained; although with imperfect and hastily collected apparatus I was called upon to treat patients carefully observed by most sceptical

eyes, and frequently patients upon whom other methods had failed, I am well satisfied with the results.

In the present unsettled state of gynecological electro-therapy, I trust that I may be pardoned these brief general observations before entering more directly upon the field which I have outlined for this paper : surgical electro-therapy, or the application of galvanism in cases of a surgical nature. Whilst in gynecological electro-therapy we may utilize faradic, galvanic, and possibly static electricity, I will speak of galvanism only, and of galvanism in cases which must of necessity become surgical unless relieved by this method.

I have confined this paper to the application of electricity in surgical cases, not because the therapeutic results of galvanism, either as a main factor or as an adjuvant in the treatment, are less striking or less desirable, but because I believe that it is well in this era of venturesome antiseptic surgery, with its brilliant achievements, to demonstrate the possibility of attaining similar results by less violent and less dangerous methods. If, for the sake of brevity I speak of surgical electro-therapy, I refer to the application of the treatment in cases of a surgical nature. But let it be well understood that I do not, in all cases, propose the electric current as a substitute for the knife. I am, myself, a strong advocate of surgical gynecology, and yet I would urge the claims of the current most earnestly in a certain class of cases and under certain circumstances. Some cases are peculiarly suitable for this treatment, and can be so rapidly relieved—cured—that the most enthusiastic surgeon will not deny the advantages of so apparently harmless a remedy over the bloody operation ; in other instances in which surgical interference would appear indicated, peculiar circumstances may necessitate a resort to this violent method. If the consent of the patient be refused for surgical interference, if it is impossible for her to have the necessary attention, or if her duties do not admit of confinement, relief should be attempted by the current : operation is out of the question, and electro-therapy must be resorted to.

Nothing is lost by this first resort to electricity in proper cases; even should it result in failure, the suffering of the patient will be allayed, her general condition improved, and surgery invariably remains with the prospects for a successful operation improved. The surgeon, as a rule, will yield most unwillingly to electro-therapy, as the *eclat* of an operation is lost: no anæsthesia is given; neither nurses nor assistants are summoned; a tumor reduced, or checked in growth, the functions restored, a dysmenorrhea, or even an hæmatocele, or pelvic infiltration cured by so simple a method as the holding of the electrodes for a few minutes, with scarce any inconvenience to the patient, brings but little glory to the surgeon. In his office, without much display, he will often accomplish results as striking as those hitherto attained by more effective surgical procedures. It is a simple, modest proceeding, with frequently striking results: the patient may often be treated in the office as she would for a simple endocervicitis, or some minor displacement; life is not endangered, and yet the success, perhaps more slow, is, in proper cases, as certain as it is to the surgeon.

Relative Merits of Surgical and Electrical Treatment in Cases Admitting of Comparison.

A. Advantages of electro-therapy.

First. Safety of the method is in its favor with physicians and laymen: danger even in cases of deep puncture may almost be precluded, and with proper antisepsis and correct methods no serious consequences of any kind are to be dreaded. The necessary precautions are, moreover, so simple that they may be observed by every careful practitioner; whilst the dangers of surgery vary greatly with the experience of the operator.

Second. The patient is not confined to bed; the continued well-being of the patient, who is usually able to continue her daily vocation, is important to many; rarely after a first application is she confined to bed, and then as a precautionary

measure; hence, this is often the only possible method of treatment to which the working woman is willing or able to submit.

Third. Its compatibility with all other methods of treatment; and that in case of failure but little is lost, as the patient will at least be in a more satisfactory condition for surgical treatment.

Fourth. Sometimes there is an advantage in this proceeding, in the avoidance of that nervous excitement so frequently caused by the thought of a surgical operation.

B. The pathological conditions which admit of treatment by galvanism, and in which I would advocate the resort to electrotherapy, with reliance upon surgery in case of failure, are in the main: (I.) *Inflammatory products* which admit of restitution, and (II.) such *Neoplasms* as offer probabilities of healthy retrograde metamorphosis.

However broad this statement, it is a foundation upon which the indications for the treatment may be based; the crude outline of the map, as was so well stated by my venerable friend, Dr. Grailey Hewitt, into which the details will be marked by progressive observers. As has already been stated, the cases favorable for this treatment are those in which it is possible to obtain restitution by a process of retrograde metamorphosis; those in which the electrolytic action of the current or the direct chemical effect of the pole may be utilized: indurations, inflammatory deposits, the results of interstitial inflammation, and certain neoplasms, deep-seated tumors which admit of healthy retrograde metamorphosis, and superficial growths which can be subjected to the direct chemical action of the pole. Such are the results of inflammation of the uterine and circumuterine tissues, induration and enlargement of the uterus by chronic metritis, stricture, stenosis, deposits in the cellular tissue, para- and peri-metritis, fibroids, and myomata, especially intramural and submucous, before they have entered upon the process of disintegration; polypi, caruncles, and hemorrhoids; whilst the necessity for the removal of the tubes and ovaries may in some cases be avoided

by the proper use of the electric current, I will not compare the results of electro-therapy in such cases with the results of operative interference, as the proper indications for both vary so much with each individual case; I will only say to those who advocate oöphorectomy for nervous disturbance with but slight pathological changes in the part, that a trial at least be given this treatment before resorting to operative procedures. Of extra-uterine pregnancy, I will likewise say but little, as I believe that surgical and electrical treatment each have their distinct indications, not, as in other cases, admitting of a choice in accordance with surrounding circumstances.

Before entering upon the consideration of individual cases, I will repeat, as I do not desire to be misunderstood, that I do not unqualifiedly urge electro-therapy in the class of cases now under discussion, as a substitute for surgical interference, but as a method to be held in view as feasible and proper to be resorted to under special circumstances, if the condition of the patient or her surroundings should make the method preferable. We shall soon be better able to formulate our indications; for the present we can say only that if the above pathological conditions exist, we may resort to electro-therapy with good hopes of success.

I. Chronic Inflammatory Conditions.

These are:

a. In the uterine tissues:

1. Stenosis, stricture, cicatricial contraction of the uterine canal;
2. Several forms of endometritis, interstitial and fungous; and
3. The enlarged, indurated uterus, produced by chronic metritis.

b. The results of inflammatory conditions in the circum-uterine tissues.

1. Suppurative forms of perimetritis;
2. The solid exudates.

a. Inflammatory Products in the Uterine Tissues.

1. *Stenosis and stricture by induration of the walls and cicatricial contraction of the canal.*—The surgical treatment of these cases, and that with which I would here contrast electro-therapy, is dilatation, rapid and slow, and excision, and, in the majority of cases, I give decided preference to the simple, harmless, and in this instance more rapid method of treatment by the galvanic current, especially if they be accompanied by induration of the uterine tissue; the treatment is less painful than even that of gradual dilatation; it is as rapid as that of excision, and preferable in every way to the brutal method of rapid dilatation, unless undertaken for the object of producing an abnormally wide canal preparatory to the introduction of other instruments for operative purposes. Extreme cases of cicatricial narrowing, in which it would be impossible to insert even the most slender dilator, can be overcome readily and rapidly by this method without pain or anæsthesia. But it is only for the purpose of establishing normal apertures to afford the necessary exit for retained fluids and to relieve the pains of a dysmenorrhœa. Actual dilatation of the uterine canal beyond its natural limits for the purpose of examination or operation, the introduction of finger or instruments, must be accomplished by the knife or the dilator. By the method proposed the stenosis or cicatricial contraction is overcome, first, by the direct destruction of the cicatrized or indurated tissues, by the cauterizing action of the conical metallic pole; and, secondly, by the absorption of the indurated tissues in the surrounding uterine walls, which is effected by the electrolytic action of the current.

The advantages of the method are that it can be practised in the consulting room; that no anæsthesia is necessary; that the tissues which cause the narrowing are destroyed, the surrounding induration eliminated, and a healthy condition of the tissues approximated, so that a return of the narrowing is not to be feared, as it is after incision and certainly after moderate dilatation.

The effect upon the uterine nerves is of the greatest importance, and I believe that the relief of the dysmenorrhœal pains, which is so easily attained by treatment of strictures by electro-cauterization, is due to this very fact, and not alone to the mechanical widening of the canal.

A most striking case of the kind I have cited in my first paper on gynecological electro-therapy, in which the external os and lower portion of the cervical canal had been so narrowed by cicatricial contraction, the result of a nitrate of silver treatment, that only the most delicate surgical probe could be introduced, hence a dilator was out of the question. The first electrode inserted was a simple sewing needle, and by a gradual increase in the size of the instrument, I was enabled within a little over five minutes to introduce a small sized uterine sound. A single treatment sufficed to relieve the symptoms, and a return of the condition is not to be dreaded. This was a case seen by many in my own clinic, but as the presence of critical observers adds to the value of the cases reported, I will also mention a case treated by myself before the Berlin Gynecological Society in June last, for the purpose of demonstrating the truth of the facts claimed in my paper previously read before that society. The patient was one kindly sent to me from the clinic of Dr. Martin, who had been consulted on account of the intense pain which she suffered with each monthly return of her sickness. By the use of great force he had succeeded in passing a sound, but immediately upon its withdrawal the previous condition returned. The patient was brought before the Society, and with an electrode prepared for the purpose, I succeeded, within less than six minutes, in widening the canal sufficiently to admit of the passage of an ordinary sound; a current of 120 milliampères was used, with a medium sized electrode upon the abdomen. No undue pain was caused, and the next menstrual period, some five days later, passed without the previous suffering. A number of applications were made after this time for the purpose of widening the canal still

more, so as to allow a large sound to pass easily, although I do not believe it would have been necessary permanently to secure the result obtained by the first treatment.

2. *Endometritis, with induration or polypoid development of the mucous membrane, interstitial and fungous endometritis.*— Cases of this kind, in which a speedy result can be obtained by surgical interference only, by the curette, can be relieved almost as rapidly by electro-cauterization with a metallic electrode as large as can be introduced, and currents of from 100 to 150 milliampères; the negative pole being used in more common forms of endometritis with induration, by which not alone the superficial layers of the diseased mucosa are destroyed, but an absorption is inaugurated in the surrounding tissues; the positive pole serving in the polypoid forms for the purpose of first overcoming the hemorrhage which usually coexists.

This method is a most happy alternative in the outdoor departments, and for the treatment of patients who have the care of their homes and cannot be confined to bed, even for a few days. Under the most unfavorable circumstances, it is at least more satisfactory than any therapeutic measures which can be adopted, and should it fail, the curette can always be resorted to.

3. *Chronic metritis, hyperplasia uteri,* usually accompanied by endometritis and a certain amount of perimetritis, and uterine displacement, descensus of the enlarged uterus. These are cases which frequently resist even prolonged treatment, and which are successfully attacked, especially by German surgeons, by the so-called amputation of the cervix, the wedge-shaped excision; and in this country, if accompanied by laceration, by Emmet's operation; the most important result of this procedure being the retrograde metamorphosis, the absorption inaugurated by the surgical interference. A similar result can be attained by the electrical treatment, by electro-puncture, the use of a strong needle as negative pole, which is passed into the indurated tissues; if

the endometritis is a leading feature, the electro-cauterization is first resorted to. In either case, currents of about 100 milliampères should be used. The process of absorption once inaugurated, faradism, with coils of low tension as a uterine massage will complete the cure.

b. Products of Inflammation in the Circumuterine Tissues.

We may compare the results of electrotherapy with surgery in two forms of this affection: the suppurative, and the solid exudate.

1. *Suppurative perimetritis.*—Suitable for this treatment are only such of the chronic forms of this affection which are accessible per vaginam and best so evacuated; this is merely a variation of the usual surgical procedure; the knife, the scissors, or dilators are replaced by the metallic electrode with the negative pole. I look upon the vagina as the most natural and satisfactory outlet for pelvic abscess originating in the circumuterine tissue, and I am entirely in accord with the methods now generally followed—for instance, that adopted by Goodell; but instead of entering with the blunt scissors or the steel dilator, I resort to a negative electro-puncture—that is, I penetrate into the sac with a metallic electrode in connection with the negative pole of the battery, or endeavor to follow the fistulous tract if this be found. An open pathway is thus established without hemorrhage, without the production of a raw, absorbing surface, and if an electrode of a sufficient size is used, there is no danger of contraction as in an opening produced by other methods. The trocar with the canula or even the dilator may be connected with the battery and used as a perforating electrode. Recent cases are best treated by free incision, with washing and drainage; but for old cases which have persisted for a length of time, with thickening of the walls and surrounding tissues, the opening by electro-puncture possesses the following advantages:

First. These cases are often difficult to diagnose; the infil-

tration is evident, but the presence of pus doubtful; the abscess walls are thick and hard, and the circumuterine tissues infiltrated so that fluctuation cannot be detected. Under these circumstances electro-puncture per vaginam, with currents from 100 to 200 milliampères, is the correct diagnostic and therapeutic measure. If pus is found, the outlet is established. If suppuration does not exist, that fact has been positively determined and at the same time the most active measure at our command to overcome this most annoying condition has been resorted to, and the treatment must be continued.

Second. It is a safe method of dilatation. The extent of its action is fully under our control; raw surfaces are not produced, and vessels which by chance are opened are not liable to bleed, as they are closed by the accompanying cauterization, and besides, they are mostly in the softer tissue, and pressed aside.

Third. I advocate this method in chronic cases of long standing, which are invariably accompanied by induration of the surrounding tissues, and the same method by which the outlet is established serves most effectively to hasten the absorption of the inflammatory products. Whilst I deem the knife preferable in recent cases of suppurative perimetritis or pelvic abscess, and in those which can be treated by laparotomy only (salpingitis with its sequences), the opening by electro-cauterization has undoubted advantages in chronic forms accompanied by induration which can be evacuated per vaginam. The method is precisely the same as that now in general use: free evacuation, drainage, and antiseptic washing; the knife, the blunt scissors, or the dilator being replaced by the negative pole of the battery. It is, perhaps, immaterial in what way the pus is evacuated if free discharge is obtained, but electro-therapy is the only method upon which we can rely to accomplish absorption after evacuation. The advantages of this treatment become more apparent as the induration increases.

2. *The solid exudates.*—Recent deposits are frequently absorbed under careful treatment, and even without treatment; but I refer to such solid, pelvic exudates which have persisted for months and years, resisting all treatment; cases which are most perplexing, in which even surgery fails to afford relief. The usual remedies are the poultice, the hot douche, and iodine, perhaps massage, pressure, and rest. These are treated most effectively, like the pelvic abscess with induration of tissue, by electro-puncture, and yield even to vagino-abdominal galvanism—that is, the galvanic current without penetration of tissue by the electrodes. I have already reported several such cases, in which solid exudates which had existed from five to twelve years, and in which all possible treatment had been tried, even by eminent gynecologists, disappeared after from twelve to twenty office treatments by vagino-abdominal galvanism, with currents not exceeding 100 milliampères. I can give no better illustration of the merits of this treatment than by the report of a case in the wards of the Berlin Lying-in Hospital, and placed at my disposal by Professor Olshausen as a test case, the patient having been in the gynecological ward for more than a month, under the hot water treatment, with but little benefit. The patient had for years been affected with prolapsus uteri, and some three or four months previous had contracted a pelvic cellulitis, as the result of which a solid mass now filled the entire left half of the pelvis, extending well into the right, so much so as to prevent the return of the prolapsed uterus. The fever had ceased, but the pains were more or less constant and aggravated by every step. The uterus being prolapsed, it was impossible to insert the electrode into the vagina, so I employed the cotton-wrapped applicator as the negative pole in the uterine cavity, placing the large positive plate over the abdominal surface of the mass. One week after the second application of 80 or 90 milliampères I was enabled to replace the uterus; the pains had subsided, the patient was perfectly comfortable and able to walk; whilst

only in the smaller right exudate a decided reduction was noticeable, the easy replacement of the uterus afforded ample evidence of the absorption which had taken place. I myself made but two or three more applications, but the treatment was continued by the gentlemen who had so kindly interested themselves in the trial.

Much as I claim for electro-therapy, I am not willing to compare its results with those of Tait's operation, as has been done by some, although the tubes and ovaries are unquestionably removed in certain forms of perimetritis which might be successfully treated by galvanism. These are cases in which the organs are removed for the suffering caused by chronic inflammatory conditions, with induration, not suppuration; but whilst enthusiastic operators do not spare these cases, I hardly believe them fit subjects for surgical interference until all other means have failed. In course of time the indications will be so strictly formulated that each treatment will be relegated to its proper sphere.

Hæmatocele. In recent cases the opening by the knife may well be replaced by electro-puncture, but in cases of long standing the electrical treatment is undoubtedly the most safe and rapid. The retro-uterine hæmatocele, like the solid exudate in consequence of pelvic cellulitis, yields readily to the galvanic current. I have myself seen these cases disappear under this treatment, and believe that not a few fibroid tumors reported in recent literature as cured by electro-therapy were of this nature. The opening of recent cases by electro-puncture to afford an outlet to the fluid is more safe than the surgical operation to any but the experienced operator, and in chronic cases the treatment by the current alone, by the vagino-abdominal application, without puncture, is free from any possibility of danger, without pain to the patient, and certain of result, even with currents of moderate intensity, from 40 to 80 milliampères. Thus in a case reported to me from the clinic of Dr. Martin, this method was tested. The patient, who had been treated without marked advantage in the wards

of one of the gynecological hospitals, constantly in bed, was rapidly improved by the electrical treatment, in the outdoor department, without puncture, by the simple vagino-abdominal application.

II. Neoplasms.

a. The electrolytic action of the current.—Notwithstanding the remarkable results achieved by antiseptic surgery, the dangers of laparotomy, for the removal of uterine tumors are still such that we must give preference to any less dangerous method, by which the patient may be relieved, and prominent among these is the electrical current: an admirable remedy in certain forms of neoplasm, but by no means applicable to all. Only certain forms of neoplasms, and neoplasms in certain stages of development or retrograde metamorphosis are amenable to treatment by the electrical current; whilst in all, the sufferings of the patient may be relieved and her general condition improved, the growth itself can be reduced in some only. Certain of these growths may be treated successfully by electro-therapy, others can be removed by the knife only, and the course to be pursued depends upon the existing pathological conditions: hence it is important that we carefully discriminate between the different forms of neoplasm in order to decide upon the relative merits of the various modes of treatment.

Dr. Martin, of Berlin, in a paper read before the last meeting of the German Gynecological Society, at Halle, in June, 1888, throws a great deal of light upon this subject. In analyzing the cases operated upon by himself he points out the large number which were found in various states of retrograde metamorphosis. Some of these forms lead to absorption, others to a vicious degeneration, and electrolysis hastens such processes when once inaugurated: hence the excellent results of electro-therapy in tumors of a healthy growth, or those in which fatty degeneration has begun. This process with the following absorption is inaugurated or hastened by the electrical

current, and it is evident that under such circumstances we may expect a reduction of the growth. But it is equally clear that those tumors which have already entered upon one of the many processes of metamorphosis which lead to degeneration cannot be revolutionized; on the contrary, as has been my experience, this form of degeneration, be it cystic, suppurative, or malignant, will be hastened, but whilst the symptoms are temporarily improved, a reduction of the tumor is impossible. An active circulation, with a healthy condition of the patient, is likewise more favorable to healthy retrograde metamorphosis and absorption. Some of the most striking, although by no means the most important, results of surgical electro-therapy have been gained in the treatment of uterine tumors. It is, indeed, a victory for so harmless a method of treatment that a large growth which threatens life is reduced, and rendered harmless by so mild a form of treatment. The analysis of the pathological conditions in cases actually operated upon as furnished by Dr. Martin, enables us to differentiate with some accuracy, and affords a probable explanation for failure or success in certain cases: it is not the inefficiency of the remedy, not necessarily the inexperience of the operator, but the character of the growth. We cannot expect, by electrolysis, to reduce a uterine tumor in cystic, suppurative, or sarcomatous degeneration; whilst in a tumor in healthy growth, or one in which the development has already ceased, a healthy process of retrograde metamorphosis may readily be inaugurated. The advantages of this treatment over the operation, even in cases in which the diagnosis is not fully established, are numerous. First, life is not endangered. Second, it may be resorted to by every practitioner with more or less probability of success. Third, even should the tumor not be permanently reduced, the symptoms will be relieved and a comparatively healthy condition approximated. Whilst in certain cases, if urgent symptoms, especially septic infection, exist, there can be no question of the propriety of an immediate operation, in general we can well endorse the

statement of the eminent surgeon, Keith, that he who resorts to the knife for the removal of solid uterine tumors, without having first thoroughly tested the effect of electrolysis, is criminally guilty.

The methods of treatment vary greatly: our first effort is always to relieve the most aggravating symptom, hemorrhage, by the use of the positive pole within the uterine cavity; or amenorrhœa, or painful and scanty menstruation, by increasing the flow by the use of the negative pole; relieving pressure upon the rectum and bladder by the absorption of adhesions which bind down the tumor, or the contraction of the tumor by faradism or weak, interrupted galvanic currents. If the tumor is soft, and consists of muscular fibre, more likely a myoma, interrupted currents will serve to contract more rapidly; if solid and hard, of a fibroid nature, a powerful electrolytic effect must be attempted. Hence the method of treatment, as the probable result, varies greatly with the character of the growth, and our failures hitherto are in part due to the indiscriminate application of the various methods of treatment to all kinds of tumors. In cases in which operation is out of the question by reason of malignancy or an unfavorable local condition, or if the consent of the patient is refused to operation, we should resort to electrotherapy for the purpose of relieving pain and discomfort, and restoring healthy functional activity of bladder, bowels, and stomach. At present, by reason of the danger connected with operative interference, patients so affected are usually brought to the surgeon in a later stage of the disease, when they are forced to seek advice by reason of the great discomfort experienced; but when the possibility of a successful treatment, which is free from danger, is more generally known to the laity and profession, these patients will seek advice at a period when a successful electrical treatment is by far more probable: in the early stages before a vicious retrograde metamorphosis has been inaugurated. Whilst the surgeon may hesitate to interfere before the tumor has attained such a size as to cause

inconvenience and suffering, he is not alone thoroughly justified in resorting to electro-therapy in the earliest stages, but it is even his duty to do so, and I believe that under these circumstances the most successful results will be accomplished.

b. The destructive action of the pole direct.—Smaller growths are, with the present antiseptic methods, so easily removed by the knife, that little attention is given to other methods, and yet the advantages possessed by the electrical treatment are such as to merit consideration. The surgical operation must be performed at the home of the patient. The electrical treatment, as a rule, can be carried on in the consulting-room or the outdoor department of the clinic, and most patients prefer such procedure to a cutting operation. In all small growths we utilize the chemical action of the pole direct. Small submucous fibroids, uterine polypi, urethral caruncles, and hemorrhoids are readily and safely treated by this method, which must not be compared to their removal by the galvano-cautery or thermo-cautery, as we have in the metallic pole of the galvanic battery a chemical cauterization, and if the negative pole be used, an electrolytic action upon the surrounding tissue, which is far more efficient toward accomplishing a permanent cure than the mere local destruction which is caused by the cautery, provided that the structure is one which admits of a retrograde metamorphosis.

Extra-uterine pregnancy. The results of laparotomy have improved so much within the last year or two that we must limit the application of electricity to suitable cases only: it should no longer be a question which is the preferable treatment for extra-uterine fœtation, laparotomy or electricity, but what are the conditions which indicate the one and what the conditions which indicate the other? There is no doubt as to the propriety of surgical interference: first, if hemorrhage or rupture of the sac has occurred: second, if urgent symptoms are present; and third, under all circumstances in the later stages.

In the first two, possibly three, months destruction of the ovum by the electrical current is generally the preferable

course, as death will then be followed by absorption without further untoward symptoms. Unfortunately, the condition is rarely discovered at this period; but if so, it is, as a rule, observed by the general practitioner, who would be unwilling to resort to laparotomy, but who may with the utmost safety test the effect of the galvanic current. The great advantages of electro-therapy in the treatment of extra-uterine pregnancy are evident, most especially so because its field is limited to the early months when the diagnosis is doubtful and the patient is usually in the hands of the family practitioner, perhaps far removed from the experienced operator.

First. At this period, when electricity can be successfully applied, the diagnosis is, as a rule, so doubtful that even the skilled surgeon would be unwilling to resort to laparotomy. There is no danger in the guarded use of the current, and even if the diagnosis is doubtful, it should be applied by the general practitioner at once, as the absorbent action of galvanism is indicated whatever the nature of the tumefaction may be.

Second. As its use is free from danger, it can be applied at the earliest possible moment as soon as a suspicion of the condition exists.

Third. It can be applied with safety by the practitioner in charge of the case.

Fourth. Should the tumefaction not disappear, other measures can still be taken at the proper time.

I believe it to be a valuable remedy, although with a limited field, but extremely important as admitting of an active interference at an early stage, when the diagnosis must of necessity be doubtful, and no one would venture to resort to the dangerous alternative of laparotomy.

Let it be understood that I do not deem it right to compare electricity with laparotomy in the treatment of extra-uterine fœtation; the former is indicated in the early months, when death of the embryo is likely to result in absorption, and should be resorted to as soon as the condition is suspected, whilst laparotomy is in place when absorption is no longer

possible, or when threatening symptoms demand immediate relief.

Résumé.—The electrical current is a potent factor in the treatment of surgical lesions, under certain conditions, which must be defined with precision if it is to be classed amongst the accepted scientific methods; this has never been done, and in consequence of the haphazard application this really valuable remedy is ignored, if not condemned, by many. In this paper I have endeavored to formulate such indications founded upon the principles which have guided my own practice, and to demonstrate the application of the remedy in surgical cases; the class of surgical cases in which we may substitute galvanism for the knife are those in which the electrolytic or chemical action of the current may be utilized, neoplasms or inflammatory products in which a retrograde metamorphosis and absorption can be inaugurated.

DISCUSSION.

The Chair called upon Dr. H. P. C. Wilson, of Baltimore, to open the discussion, who responded as follows:

Dr. Wilson.—Mr. President, I had something to say yesterday, and I had supposed I had said all I had to say on the subject of electricity in gynecology, but I have been very much pleased that Dr. Engelmann has brought this subject before us again, as it is one in which I am greatly interested. For the past twelve months I have been using electricity quite extensively; using it imperfectly, I know; using it with electrodes and batteries which are imperfect, but still I have been greatly encouraged in the results I have obtained. I agree with Dr. Engelmann, that very much of our success depends upon the selection of our cases. If we take every tumor that comes before us and perform a laparotomy, I think a large proportion of them will die; it is only when we select proper cases that we have good results. And so in the use of electricity, if we are as careful in selecting our cases for treatment with electricity, we will, I believe, get good results. One of the most gratifying results I

have had in the last twelve months (before that I never used electricity, I am trying to perfect myself in it, and I think it has a great future before it in the practice of gynecology) was that of a woman with a large intramural fibroid tumor, so that the whole pelvic mass was thoroughly adherent, and there was no chance for any operation or any relief to the woman that I could see. I would gladly have passed her over to someone else if I could have gotten rid of her, but I suggested the use of galvanism, and passed one electrode into the cavity of the uterus, and a broad belt electrode, such as I had, over the abdominal walls. I commenced with galvanism, and after the first two or three applications the woman's whole appearance, her whole condition seemed to be very much improved, and from wanting to die, and suffering great pain, and being generally miserable, she was made very comfortable. She continued to come to me until, I am satisfied, the tumor was reduced to one-third; the swelling around the tumor was diminished, and the woman was altogether a different woman, and anxious to live and not to die. I have not seen her since I went to Europe this summer, and I expect, by this time, she will be greatly improved, because when we have used galvanism in these cases we do not get the whole of the beneficial results while we are using the remedy, but the results are progressive, and appear some time after the applications have ceased.

Dr. Keith told me that the good results to be obtained from galvanism ought to be had, even in the worst cases, in about thirty sittings; that if you did not accomplish the desired result in that number of sittings, you would not accomplish it in sixty sittings. He impressed upon me what I have just stated, that the results would follow even after you had ceased to use the remedy. I saw a good deal of Dr. Apostoli, who was very kind to me. I spent from four to six hours daily in his clinic, he diagnosing the cases for me, and insisting upon my examining them afterward. The written histories were read to me, and the testimony of the patient was given to me, so I had great pleasure in attending those clinics and verifying his statements. He told me that whenever he could pass an electrode into the cavity of the uterus for fibroids, he preferred not to puncture. He lays great stress upon the external electrode, and this, as you all well

know, is the clay pad, and of its advantages above all other electrodes for abdominal purposes, there is no doubt in my mind.

I will not detain the Society any longer on this subject. Dr. Engelmann has brought this subject out perfectly in accordance with my views, and I coincide with him in all he has said. I think it will be with electricity, as it is with any new subject—just as it is with any new operation or any new medicine; it will be used improperly, it will be used for all sorts of cases, success will be accomplished and accidents will happen, but if the profession will take this subject up and thoroughly investigate it, I feel confident there is no therapeutical remedy in a great many gynecological cases that heretofore we have considered incurable, and to which we have been unable to afford any palliation so good as electricity, and I believe there is a great future before it.

Dr. Grailey Hewitt, of London.—I am not in a position to make any observations on this subject. I am still a student, and I am not able to give results of any account. The subject is a new and a difficult one. It is a very great advantage at the outset of any particular line of practice that we should have a skeleton map of the country before us, so to speak. The first stage is the production of the skeleton map. I think Dr. Engelmann's paper affords us that map. It gives us just a proper appreciation; it gives us an indication of the points to which attention should be directed in the first instance. It will be for subsequent observers to fill up the further information on the subject. So far as I can judge from what I have seen, I should say there is a very great place for this method of therapy. I should think the electrical treatment is destined to effect a great deal in the way of alleviation of human suffering, and I think that the remark of Dr. Engelmann, that in cases which are at all doubtful, this is a plan of treatment which should be adopted, before rushing into the performance of a serious operation; I think that this point should be emphasized. I think it is unquestionable that the tendency to operate has become a very great one, has become excessive; that it will have to be limited, although we cannot say precisely where it should be limited. It is an alternative which it is our duty to adopt and try before performing a serious operation, in all cases in which there is any doubt whatever about the matter.

Dr. W. H. Parish, of Philadelphia.—I would like to gain some little information in reference to the use of electricity in cases of pelvic suppuration. It is well known that the most favorable results are obtained from electricity, when it is used in cases of pelvic exudation. I have seen in some instances pelvic exudation extending up as high as the umbilicus, disappear in a short time under the use of electricity, but in these cases I deem it probable there was no suppuration. Now, the question comes up in my mind: To what extent is it true that in a well-established pelvic abscess the use of electricity is advantageous, is curative, or, in fact, safe? I am asking for information. This question is one of considerable importance. If there is pus, delay in opening the abscess may be extremely harmful. I understand how, in a fibroid, delay is not particularly disastrous to the patient, and how, if electricity does no good, it does no harm. But in pelvic abscess the delay for the trial of electricity permits the abscess to become larger, and probably it will open through some objectionable tract, as the bladder for instance. I would like to know whether electricity is of any advantage when there is even a small amount of pus, or whether, if being of benefit, the benefit is to be expected only when the suppuration is in the connective tissue of the pelvis, or also where there is pus in the tubes. I have absolute proof in my own experience as an operator, proof based on an abdominal incision—that pus does not always begin in the tube after labor. It seems to me that if there is a limited amount of pus with exudation in the areolar tissue of the pelvis, that the possibilities are greater that electricity may secure its absorption; but if the pus is in the tubes, it seems probable that electricity would not produce such advantageous result.

Dr. Engelmann.—I had hoped that the statements would here be reiterated which were made to me some days ago, in evidence of the value which Dr. Keith now places on this remedy; that unless circumstances were such as to necessitate immediate action, he should consider an operator criminally guilty if he surgically attacked a fibroid, without first having attempted this method of treatment; of the large number relieved by electrolysis and the comparatively small number of cases in which there was necessity for surgical interference. I thank

Mr. Grailey Hewitt very much for his kind appreciation of my paper. I have endeavored to point out the necessity of adopting more scientific methods, and of defining precise indications; this I have attempted, but all I can now do is to draw a crude outline. So much is still to be determined; heretofore electrotherapy has been resorted to without a knowledge of the pathological condition under which it might be successfully applied, and without which we cannot expect good results. It would certainly appear reckless if any other method of treatment, operative or therapeutic, were adopted without first canvassing the reasons for such procedure, and understanding the condition under which a successful issue is to be expected, and these we must know before proceeding. Heretofore, if a case seemed hopeless, if it had resisted all known methods of treatment, the poles of the battery were applied; just how, and just why was immaterial. This is the position now to be determined. It is not of much importance whether a certain operator has succeeded in one or more cases; but why he succeeded, what were the pathological conditions which admitted of a successful application of electro-therapy? This we must know.

I am afraid that I have been misunderstood in regard to the management of pelvic abscess. Dr. Parish is right in what he says and surmises—that, if suppuration exist, the metallic electrode serves precisely as the dilator, or the scissors, would in opening the canal. If we find little or no pus, then the galvanic current is a most excellent remedy in itself, because it hastens absorption of the inflammatory mass most effectively in well-marked suppurative perimetritis. The current furthers the absorption of the thickened tissues which surround the abscess, and by the chemical action of the metallic pole a safe outlet is established which does not present the features of an open wound. I should certainly not expect any effect upon a purulent salpingitis, and, in fact, no effect if pus has already formed, unless possibly it be inspissated in the connective tissues low down in the pelvis. The process which is inaugurated by the current is that of absorption, and pus in large quantities cannot be absorbed. It is in indurations, as Dr. Parish has stated, that the best results are obtained.

SPECIMEN OF OVARIAN PREGNANCY.

By Matthew D. Mann, M.D.,
Buffalo, New York.

As it has been utterly impossible for me to prepare a paper, I have decided simply to show this specimen, which suggested the subject to me, and make a few remarks upon it.

The statement has been made by many would-be authorities, that all ectopic gestations are primarily in the tubes: that the so-called abdominal and ovarian pregnancies are really tubal pregnancies; tubal at least in their origin, the impregnated tube bursting and the fœtus escaping into the abdominal cavity. This seems a curious mistake to anybody who has studied the literature of the subject, for a large number of ovarian and some abdominal pregnancies have been reported, in which the tubes were not implicated at all. Varieties of these have also been observed; for instance, one was reported by Currier in the *Annals of Gynecology*, where the ovum was partially in the fimbriated extremity of the tube, and partially in the abdominal cavity. As regards ovarian pregnancy, Spiegelberg, in a very carefully written paper, after looking over the subject and investigating thoroughly all the cases reported, concluded that there were thirteen cases on record—undoubted cases of ovarian pregnancy. Since then one or two more have been reported, which were, it seems to me on careful examination, properly so called.[1]

Last year a specimen was presented to me by Dr. Freeman,

[1] See Gottschalk, Centralblatt für Gyn., p. 727, 1886.

of Smythport, Pa., which seems to come very near settling this question, if there was any doubt in regard to it before. There was little or no history to the case, the woman having died of some unrecognized disease. Post-mortem a cyst was found in place of one ovary, the tubes being intact. When the specimen was taken from the body the cyst appeared to be perfectly transparent; Dr. Freeman states that he could see through the walls and distinctly see a fœtus. It was unfortunately put in a pan of water, and frozen, and afterwards boiled by mistake. After that it was put in a very weak solution of alcohol and water and kept there a year or more, the solution being scarcely strong enough to preserve it. When the specimen came to me I opened the sac and found that it contained a milky fluid which looked like thin boiled starch, and also a circular flattened disk, which was attached to the inner surface, and which I took to be the placenta. No fœtus was to be found, although the doctor said that the fœtus was unquestionably there when he first saw it. I think it was so young that it was melted by the post-mortem changes which took place. On opening the sac the placental mass was detached and fell out; it was partially decomposed, but it was undoubtedly placental tissue.

This shows then very conclusively that ovarian pregnancy does exist, so if the ovum can grow outside of the tube in one case, why not in another, and hence why may there not be abdominal pregnancy? It was that question which I proposed to discuss and try to prove, and which, unfortunately, I have not been able to do.

ON THE INDICATIONS FOR PRIMARY LAPAROTOMY IN CASES OF TUBAL PREGNANCY.

By J. E. Janvrin, M.D.,
New York.

Two years since, I presented to this Society the history of a case of tubal pregnancy in which I had diagnosticated the existence of the tubal form of pregnancy as early as the beginning of the fifth week, and in which, at the end of the sixth week or the beginning of the seventh, after three applications of galvanism, given on three successive days, the patient suddenly died from a profuse hemorrhage from a small artery located upon the peritoneal covering of the tube. In that paper I stated that the galvanism had nothing to do with the rupture of the artery; that the rupture was simply the result of the peripheral distention of the tube; and that I believed that in all cases of tubal pregnancy *the attacks of "colicky pains" and the shock accompanying them were simply indications of very slight lacerations of the nerve filaments in, and slight hemorrhages from, the peritoneal surface of the tube, caused by the growing fœtus and placenta.*

The deductions were, that in all cases of tubal pregnancy, prior to the end of the fourth month of gestation, it would be far better to perform laparotomy than to trust to the use of electricity in any form.

During the past two years or more, I have on every possible occasion advocated the performance of abdominal section in *all cases of tubal pregnancy just as soon as the diagnosis has*

been made; whether there has been *slight laceration* of the peritoneal covering, and consequent small hemorrhages, accompanied by tearing of the nerve filaments and some shock; or whether there has been a *decided rupture* of the entire tube, with severe shock and partial or total extrusion of the fœtus into the abdominal cavity; *or even if there has been no laceration whatever.*

In a paper on "Primary Laparotomy in Tubal Pregnancy," which I read before the Medical Association of the County of New York, early in April last, and published in the *New York Medical Journal* of April 28th, the operation was defined as follows: "Abdominal section performed for the removal of the tube and its contained fœtus before any hemorrhage has occurred into the peritoneal cavity from a rupture, or a partial rupture of the cyst wall, the pregnancy having been diagnosticated prior to the laparotomy, and the operation performed with the expectation of delivering the tube and its contained fœtus *intact.* Furthermore, this must have been done before the fourth month of gestation."

Up to that date but one case had been reported, viz., by Dr. Joseph Price, of Philadelphia, a successful case, performed on Sept. 11, 1887.

Dr. J. S. Hawley, of New York, in the *New York Medical Journal*, June 16, 1888, reports the second case, the operation having been performed with perfectly successful result as regards saving the mother's life, on April 29, 1888, some two weeks subsequent to the reading of my paper before the Medical Association of the County of New York. While giving me the credit of having first fully described this operation, and of having urged its performance during the past two years, Dr. Hawley says: "The operation has been proposed for the last twenty years, but never performed, so far as is known, until Sept. 11, 1887, when Dr. Price, of Philadelphia, removed the tube containing a fœtus by abdominal section."

The latter part of the above quotation, viz., that Dr. Price,

of Philadelphia, was the first to perform primary laparotomy in this class of cases, and that he did so on Sept. 11, 1887, is, as I had already stated in my paper published some two months previously, correct. But the statement that "the operation (*primary* laparotomy in cases of tubal pregnancy) has been proposed for the last twenty years," is, I think, incorrect. This operation, as far as I know, I was the first to propose, and that only during the past two years, or a little more.

The operation, first proposed in 1857 by Kiwisch, and again by Dr. Stephen Rogers, of New York, in 1867 (and I would state here that Dr. Rogers was not aware of its having been previously proposed), was not the "primary" operation. It was confined absolutely to those cases in which the symptoms were such as to indicate, not only that extra-uterine pregnancy existed, *but that a rupture of the tube had already occurred, and that the patient was rapidly succumbing to hemorrhage.*

The operation in all such cases is demanded at once, or as soon as the patient has sufficiently recovered from the shock incident to the hemorrhage, and the operation is in every aspect a *secondary* one.

Having separated the two classes of cases into two distinct fields of operation, both as to the time of performing it, and also as to the conditions obtaining at that time, I will endeavor to point out the "indications" for the operation in "primary" cases.

If abdominal section in these cases is ever to supplant the use of electricity; and the unruptured tube, with its contained fœtus and membranes, is to be *removed* instead of destroying it *in situ* (with the risk of causing subsequent trouble to the mother) it can only be brought about by a clear understanding and full appreciation of the symptoms which exist in these cases, even as early as the fourth week of gestation.

In the cases which have come under my own observat on, and which have been recognized early, the following tra n of

symptoms has invariably been met with and I believe they very nearly accord with the observations of others interested in this subject:

The passing over one period, followed, as a rule, in the course of a *week or two by a slight "show," this show continuing for only a few minutes, or a few hours at most, and repeated in all probability within a week*, while at the same time the *usual* symptoms of pregnancy exist, should be sufficient to arrest the attention of the physician and notify him that pregnancy probably exists.

The attention once called to this probability there would be *no* excuse for neglecting to investigate the case fully, and making an effort to find out the meaning of these recurrences of slight hemorrhages. An examination of the expelled fluid will almost invariably show the existence of decidual membrane, either in shreds or in a pretty well-defined membranous condition. Physical examination of the patient reveals the os uteri softened and patulous, the uterus slightly enlarged and heavier than normal, and almost always tipped to one or the other side of the median line, the line of inclination always being away from the tube which contains the fœtus.

If the tube occupies its normal site (and, as a rule, I believe it does), it will be felt as a semi-elastic, globular mass to the right or left of the uterus, as the case may be, probably not larger than a pullet's egg, or a small lemon, somewhat, though generaly *very slightly*, movable, and at all times *very sensitive* to the least touch or manipulation. In addition to these symptoms, we also get the strong arterial pulsation of the tumor. This symptom, extreme sensitiveness, I consider very diagnostic of this condition, when taken in conjunction with the other symptoms.

The presence of a *vital* growth in the tube, and the accompanying congestion and rapid distention of the tube, would be much more likely to cause this tenderness and extreme sensitiveness than would a hydro- or pyosalpinx. Of course, the relative position of the tube may vary. It may drop down,

in a perpendicular line, upon a level with the internal os uteri, thus crowding the uterus, as a whole, to the opposite direction still further than it assumes when the tube does not descend, or it may fall backward into the *cul-de-sac*. Whichever position it assumes, the mass is easily made out, and the only question which can come up is that relating to its character.

With this train of symptoms existing, it is *perfectly justifiable* to explore the cavity of the uterus, and when this is done the depth of that organ will be found to have increased very little above its normal standard. Usually not more than three inches (in depth) at the fourth or fifth week of gestation, and rarely, if ever, exceeding three and a half inches at the third or fourth month.

It has been stated by several authorities that extra-uterine pregnancy is much more apt to occur in women who, having borne children, have passed a long interval, from seven to ten years, from the time of the last normal pregnancy to the date of the abnormal pregnancy. Also, that it is more likely to occur in women who are illegally cohabiting than in the wife.

I believe that both these assertions, as a rule, are correct, my own experience and observation pointing in the same direction.

Some six years since I reported to the New York Obstetrical Society a case of interstitial, or utero-tubal pregnancy occurring in a lady of about forty years, the mother of four children, the youngest ten years old, in which I diagnosticated the condition at the seventh week of pregnancy, and in which, after a pretty thorough manipulation of the tube (and perhaps as a *a result* of the manipulation) the fœtus passed into the cavity of the uterus and there remained in an atrophied condition for two months longer; at which time it was expelled and fully demonstrated to be a fœtus of but two months' actual growth.

Several cases of *tubal* pregnancy I have also seen occurring some seven or eight years subsequent to the last normal pregnancy, the woman having been perfectly regular in the inter-

val; also one case occurring in a woman who had been living in illicit relations for some eight years and who had been perfectly regular as to her menstruation during the whole time.

With the symptoms above described there can be no doubt as to the existence of a tubal pregnancy, or of *some* growth which needs the attention of the gynecologist, with the preponderance of symptoms pointing to the first-named condition.

Accepting the diagnosis of pregnancy as probably the correct one, the simple question to decide is this—shall we perform abdominal section and see what we have to deal with, and remove it, if justifiable, (as there is every reason to believe it will be) or shall we resort to the use of electricity?

The exploratory operation in the hands of a good gynecological surgeon (and, of course, in recommending this operation I mean to include only those who have had experience in abdominal surgery) entails so little danger that it is frequently resorted to in cases of simple hydrosalpinx and in many other conditions in which it would be perfectly safe to let the patient wait weeks, or even months, without any serious danger or detriment supervening.

I wish distinctly to be understood that in all *such* cases (hydro- or pyosalpinx) I *should* wait until some urgent symptoms did occur indicating that an operation was demanded.

But in these very early cases of tubal pregnancy we have a condition which is becoming more serious every moment, and endangering the mother's life with every breath which she takes. It is, either abdominal section and removal of the tube, simply distended by the fœtus and membranes, but perfectly intact and free from adhesions (an operation extremely simple to a good operator), or it is the destruction of the fœtus by electricity, and leaving it in the abdominal cavity, in many instances to produce subsequent serious complications.

In lieu of the one or the other of these alternatives, there remains only the expectant treatment—doing nothing, which really means no treatment whatever, and can therefore hardly

claim a place in the hands of the surgeon of the present, day.

As will be seen from this short presentation of the subject, the "indications for primary laparotomy, in cases of tubal pregnancy," in my mind are simply an early recognition of the symptoms which go to make up a pretty clear diagnosis of the existence of such a condition. That an early diagnosis, as early as the fifth week, can be made out has been proven by the experience of others, as well as by my own, during the past ten years.

For the past two years or more, as previously stated, I have urged upon the profession on every possible occasion, in writings and in discussions, the propriety of abdominal section in all such cases, and I am pleased to be able to record the two operations, both successful, the first by Dr. Joseph Price, of Philadelphia, one year since, and the second by Dr. J. S. Hawley, of New York City, some four months since, in both instances the operation having been done about the seventh week of pregnancy, and the tube and its contents removed in their entirety.

I believe that in the majority of cases of extra-uterine pregnancy the impregnation begins in the tube, and that the different varieties, utero-tubal (or interstitial), ovarian, and also abdominal, are generally the remote results of this condition. I also believe that it is the *exception*, when the rupture occurs in these cases, for the fœtus to be carried in the folds of the broad ligament. This does sometimes occur, as we all know and it is the conservative method which nature adopts to carry on the pregnancy.

As to whether the placenta, as Mr. Tait contends, goes on increasing in size after the death of the fœtus by electricity I am hardly prepared to give an opinion. The case of my own which I reported two years since, and which died from rupture and hemorrhage after the death of the fœtus by galvanism, certainly points in that direction.

In closing this short presentation of the subject I am glad

to add, as a substantiation of the views which I have persistently advocated of late years, the testimony of Dr. Hawley, who closes the report of his case as follows: "When the time shall come when dangerous methods are almost exclusively used for the relief of infinitely more dangerous conditions, and simple means of treatment are employed in disease rarely, if ever, compromising human life, primary laparotomy for early tubal pregnancy will no longer receive the odium of a verdict reflecting on its character as a justifiable operation, but will occupy an honored and prominent place among the brilliant and truly surgical achievements of the present age.

I believe, Mr. President, and Fellows of the Association, that that time has already come, but at the same time I am also aware that many members of this body still question the propriety of its use in cases in which electricity can be employed for the destruction of the fœtus. It is a question which needs the most thorough and careful deliberation on the part of this Society, and it is with the hope that the views here presented will be thoroughly discussed and criticised, that I have been led to bring them before you.

ON THE EARLY DIAGNOSIS OF ECTOPIC PREGNANCY, AND THE BEST METHOD OF TREATMENT;

With the Report of Two Cases Successfully Treated by Electricity.

By Horace Tracy Hanks, M.D.,
New York.

Any facts which may help to make the diagnosis of ectopic pregnancy more easy, and the treatment of this always painful and necessarily exceedingly dangerous condition, more certain and safe, demand our most careful consideration. During the last three years there have been ninety-seven cases of ectopic pregnancy reported in the medical journals which are printed in the English language. Thirty-one of the ninety-seven had no operation. To show you how grave an accident this condition is when left to nature, I will state that eighteen of these thirty-one cases were fatal before the end of the eighth month; and, of course, we cannot estimate the probable results in the other cases.

Of these eighteen cases:

One	died	during	the	first	month	of	pregnancy.
Five	"	"	"	second	"	"	"
Three	"	"	"	third	"	"	"
Three	"	"	"	fourth	"	"	"
Two	"	"	"	fifth	"	"	"
One	"	"	"	sixth	"	"	"
One	"	"	"	eighth	"	"	"

Two period of gestation not given.

Of these eighteen deaths one-half died before the end of the third month of pregnancy. Of the thirteen who recovered

without the use of electricity or the knife, or were living when the case was reported:

In four cases the fœtus sloughed into the rectum.
" one case " " " " " bladder.
" four cases " " was forced or sloughed into the uterus.

I wish to call your attention to the narration of two cases which have come directly under my own observation. I believe that at least ninety-five per cent. of all such cases can be diagnosticated to-day by the better drilled members of our profession, and that the time has arrived when not only the specialist in diseases of women, but every obstetrican, in all sections of our country, would hardly be excused if he should overlook a case of typical ectopic pregnancy, when he has had an opportunity for a thorough examination of the same.

See Dr. T. G. Thomas: Trans. Amer. Gyn. Soc., 1882.
" " Garrigues: Trans. Amer. Gyn. Soc., 1882.
" " Stephen Rogers: Trans. Amer. Med. Assoc., 1867.
" " J. C. Reeve: Trans. Amer. Gyn. Soc., 1879.
" " J. S. Parry: Extra-uterine Pregnancy, p. 175, 1876.
" " Howard: Trans. Amer. Gyn. Soc., 1879.
" " Reamy: Trans. Amer. Gyn Soc., 1879.
" " Robert Barnes: British Gyn. Soc., p. 50, 1888.
" " Routh: British Gyn. Soc., 1888.
" " Edis: British Gyn. Soc., 1888.
" " Heyward Smith: British Gyn. Soc., 1888.
" " C. C. Lee: Annals Gynecol., p. 170, 1888.
" " Grandin: Encycl. Obst. and Gynecol., vol. ii. p. 374.
" " Lusk: Amer. Journ. Obst., p. 251, 1885.
" " J. R. Chadwick: Trans. Amer. Gyn. Soc, p. 303, 1887.
" " Martin: Trans. Amer. Gyn. Soc., 1887.
Mr. Tait believes we can diagnosticate 85 per cent. See Trans. Brit. Gyn. Soc., 1887.
Charpenter: Ency. Obst. and Gyn., vol. ii. p. 353. "In many instances a diagnosis is made at the beginning of pregnancy.

The recent discussion of the subject by this Society, and in the British Gynecological Society, and in various articles in the medical journals, cannot fail to convince the thoughtful specialist that there should be no uncertain sound to our words, as we sum up the evidence in support of our belief in our

ability to make an early diagnosis, and to treat successfully the vast majority of cases.

The advocates of laparotomy for the cure of this accident are so sure of their diagnosis, that they open up the abdomen, never doubting but that the procedure will confirm their previous opinion. Dr. Martin says,[1] this was now frequently done in Germany when the pregnancy had not reached the third month, and Mr. Tait has done eight before the third month. Most certainly we ought to be able to say that the diagnosis of every case of ectopic pregnancy should be made with great certainty on the second or third visit.

The pathological changes which are found in the pelvis in this condition, have symptoms as positive, and the changes are no more hidden from the inspection of the wise physician, than are the pathological changes which are constantly diagnosticated in the thorax. I shall not discuss the interesting question of the etiology of the condition, neither shall I advance any opinion respecting the different varieties of ectopic pregnancy. I shall speak more frequently of tubal pregnancy, because I believe that *nearly all the cases are tubal in the first month.* I believe, of course, that there are abdominal pregnancies in later months, but just where the ovum was impregnated and found its *first* lodgement, even in these cases, is far from being demonstrated. The clinical fact remains, that we can never determine, with absolute certainty, during the first months of pregnancy, just what tissues are adjacent to, or surrounding the ovum. And it matters but little if we cannot, since we can use electricity to destroy the fœtus with equal certainty, wherever it is, in the early months. Later, when a laparotomy is required, we are better able to determine the lodgement of the fœtus, and be prepared to meet the conditions consequent to each type of ectopic pregnancy.

I shall, therefore, call your attention for a time to the

[1] See Trans. Amer. Gynecol. Soc., 1887.

important subject of diagnosis, drawing such conclusions from my own cases, and from the cases of others reported during the last three years, as will help to make the subject of diagnosis better understood, and consequently more certain. In conclusion, I shall suggest a course of treatment which must be varied according as we have learned from experience, that electricity seems best suited to accomplish the end desired in a certain class of cases, while in another class of cases laparotomy is absolutely imperative. And in a third class of cases, delay and a plan of watching may be safely pursued. With these remarks I invite your attention to the following histories.

Case I.—Mrs. F., twenty-eight years, married six years, one child five years ago. Has been under my professional care for several years for uterine and tubal catarrh. She has been much improved, and has not been seen regularly for the last six months. Was accustomed to consult me on all occasions, when in any way ill, and would have consulted me if anything unusual had occurred to disturb the function of the sexual organs. She called on me on March 15, 1887, and reported that she had not been unwell on the tenth of March as she ought, and being anxious for a child, asked as to the probability of pregnancy. She complained, at the time, of a feeling of fulness in the breasts, and a desire to pass urine often, with a slight gastric disturbance, etc. I encouraged her to believe herself pregnant, as she was a woman in full vigor of a fine physical development, and had always been perfectly regular except when pregnant. She did not consult me again until April 5th, when she reported that she had lost some blood, and had expelled some solid matter, which I saw and believed to be decidua of pregnancy. She had occasionally had severe, but not alarming pain in the region of the left ovary. I believed she was threatened with an abortion, and ordered absolute quiet in the recumbent posture, with the use of chloral and morphia, and fl. ext. viburnum prunifolium. She remained much the same, occasionally losing a small amount of blood, which sometimes came away in a gush, and at times suffering from a severe pain in the left ovarian region. These

pains gradually grew more frequent. On April 16th they became exceedingly severe, so that the countenance of the patient expressed the greatest anxiety and distress; the pulse during and after each paroxysm was rapid. Only morphia in full doses, hypodermically, afforded any relief from pain; while stimulants were given *pro re nata*. An additional piece of decidua was now expelled. There were no febrile symptoms, however. Fearing an extra-uterine pregnancy, a gentle but thorough bimanual examination, by vagina and rectum was made. The uterus was found in normal position, slightly enlarged, movable, not excessively sensitive, with no appreciable increase of temperature, normal density, os externum open to size of No. 18 American scale of bougies. Pulsation of pelvic arteries exaggerated. To the left of the body of the uterus in the region of the left ovary and tube, an elastic, exquisitely sensitive, movable, ovoid tumor, one and a half by two and a half inches, was discovered. This tumor, I was absolutely certain, did not exist early in January last.

The patient was kept under the influence of morphine hypodermically administered. Her friends were advised of her condition, and Prof. Thomas was called as consultant physician on Monday, April 18th. He confirmed my diagnosis, and concurred in the advisability of using electricity at once. Accordingly, on the afternoon of the same day, I applied an interrupted current of a galvano-faradic battery, for a period of ten minutes, using a current as strong as I was able to bear in my own hand. I inserted one electrode, negative, in the rectum, the other, the positive, was pressed up in the vagina against the tumor. The pain was well borne by the patient, as she was under the influence of opium. She had no more distress that night, and was able to do without opium.

The same amount of electricity was again applied on the 20th, but it caused so much pain I decided to give the patient chloroform during its administration. I kept it up for eight minutes. I made sudden changes in the amount of electricity on this occasion, as the patient was anæsthetized. She had no increase of hemorrhage, no return of pain, no enlargement of tumor. April 26th the same amount of electricity was again applied, in a similar manner. From this time the breasts became flabby,

the nausea ceased, and the tumor was decidedly less tense, and was far less sensitive.

The patient continued to improve from that time. She lost much blood per vaginam, however, for two weeks, and I was obliged to tampon the vagina, pressing the cotton well up.

Subsequently, the first and second menstrual flow was quite excessive, and she was kept in bed for several weeks longer than would otherwise have been necessary.

September 1, 1887. The tumor is smaller, denser, less sensitive, and has slightly changed its position, resting to-day backward, and nearer the median line.

July 1, 1888. Patient is in perfect health, and has been so for twelve months. The tumor can be felt in about the same position, it is smaller and more dense, and not at all sensitive.

Case II. *Tubal Pregnancy.* — Mrs. L., mother of three children, stout, weight 165 pounds, generally very healthy, youngest child three years old. Has had comfortable pregnancies. She was attended by myself five years ago for a sharp attack of periuterine inflammation following an abortion of three months. There was at that time a decided infiltration and exudation near the right horn of the uterus, undoubtedly involving the right tube. She had been under the care of several physicians before I was called, and had lost considerable blood for three weeks. She gradually improved, however, and in six months became *enciente* again, and passed the full time without complication. The labor was normal, the convalescence satisfactory. She grew stout after the child was weaned. Her menses were regular, she tells me, from the time of weaning the child until a few weeks before I was called to see her on March 21, 1888. She menstruated normally from January 1st to January 6th, also from February 1st to February 6th. On March 1st she had a show, just sufficient to stain slightly one napkin. She was willing to bear children, was intelligent, and had no doubt in her own mind but that she was again pregnant. On March 16th, while walking home from church, she was seized with pain in pelvis near the right groin. The pain she described as intense, and far more cutting and agonizing than the trying early or severe later pains of an abortion. A dose of paregoric in hot water was taken as soon as she reached home,

and she soon felt so relieved that she was about as usual and superintended her household duties on the following day. She was so quickly relieved, that she thought it must have been simply a very severe attack of intestinal colic. On the 21st, five days later, another, and even more unbearable spasm of pain came on. It seemed to originate in the same locality as the first. I was summoned on this occasion, and found her somewhat easier, as she said, but still suffering considerable pain in the region of the right ovary. She was lying upon her back, with knees drawn up. Face ruddy, pulse and temperature normal. No tympanites around locality of pain. Bowels had moved normally during the day. Bladder had also been lately emptied. Still, I had no doubt that she had been suffering great pain, as she was not a woman to exaggerate in the least, and would endure great pain without a murmur. I made a vaginal examination, but as she was so exceedingly fleshy, the result was quite unsatisfactory. A hypodermic injection of morphia was sufficient to make her absolutely comfortable. The next day she sent word to me that she was quite well. I did not cease to be anxious about her condition, however, fearing every day that she would be overwhelmed with another, and a far more severe attack. She went until the 29th, eight days, without having any serious trouble, and on this day the pain was slight, but sufficient to induce her to send for me. I found, on making a careful vaginal examination, that the uterus was slightly pushed to the left; the organ evidently three to three and a half inches in depth. The arterial circulation was exaggerated, the vagina blue. To the right of the uterus, I found a small, ovoid, elastic tumefaction, about two to two and a half inches, exquisitely tender, and located in the neighborhood of the right tube, fully one and one-half inches from the right vaginal fornix. Rectal examination convinced me that it was movable, not immediately connected with the uterus. I could, therefore, exclude a fibroid tumor connected with the uterus, and the fact that there had been no fever enabled me to exclude cellulitis or peritonitis. I believed that I had a case of tubal pregnancy, but as there had been but a very slight show, and as she thought she was having a miscarriage, and as the last two attacks of pain had been bearable, I decided to wait for the expulsion of decidua, or the rapid growth of the tumor,

the two most positive symptoms, before calling council, and resorting to electricity or laparotomy. She had had the usual symptoms of *pregnancy* from March 1st. These were still present, and she had several slight attacks of pain and a quite continuous flow, but never a great gush of blood, up to April 7th. On that day some portions of decidua were expelled, and I was convinced that the tumor had decidedly grown during the last ten days. April 8th Dr. C. C. Lee, and Dr. George E. Abbott, were both called to see the case, and without knowing my diagnosis of tubal pregnancy, each, independent of the other, made a similar diagnosis. And we all agreed that electricity should be tried at once. A small galvano-faradic battery with the interrupted current was used immediately. One electrode, connected with the negative pole, a small metal ball, half-inch in diameter, on the usual insulated handle, was pressed up the rectum and pressed out under the right ovary. A similar one, connected with the positive pole, was placed in the vagina as tightly as possible against the region of the adjacent tumor. The patient bore for fifteen minutes the full strength of the battery, which was all I could endure in my own hands. The pain became less after this *séance*, but the flow was not changed.

On the 9th, 10th, 13th, and 17th, I gave the patient for fifteen minutes each day a similar treatment. She felt certain that the pain had almost entirely ceased after the first application, and by the 13th the gastric disturbance had ceased, and the breasts had become flabby. I was sure of the latter condition, also that the exaggerated arterial circulation in the vagina had diminished, and that the tumor was less tense. I was not able to determine if it had diminished in size. In fact, at no time, owing to the large amount of adipose tissue in those parts, could the tumor be as distinctly circumscribed and mapped out, as the tumor in Case I.

April 25. The patient free from pain, with no sign of pregnancy. Tumor softer and decidedly smaller.

May 7. She menstruated normally.

June 8, 1888. Patient came to my office; feels well. Is menstruating regularly. The tumor can still be felt in the right side of the pelvis, in its original position, but not larger than a small English walnut, and not at all sensitive.

Here in the United States the great majority of physicians have no doubt of the advisability of using electricity to destroy the life of the extra-uterine fœtus of not over four months. The all-important consideration is to make the correct diagnosis. *I* believe this can be done in ninety-five per cent. of all cases we are called to attend. Because a laparotomy, in itself, has often been found comparatively safe, is but a poor argument for throwing away the knowledge which is within the reach of all who will carefully study symptomatology and physical diagnosis. No wise physician can afford to open the abdomen until he has at least made a surgical diagnosis, even though the exact pathological condition may not be clearly understood.

In order to make a correct diagnosis, we must first consider whether it is probable that the patient is pregnant. After this matter is decided, a careful examination of the abdomen should be made by inspection, palpation, and percussion. If there has been undue abdominal pain, with loss of blood, with expulsion of decidua, without a fœtus, then a thorough digital examination should be carefully made per vaginam and per rectum, placing the patient in different positions, etc., until the parts are perfectly mapped out. Ascertain whether the uterus is in normal position, of normal size, shape, sensitiveness, and mobility. Also whether there is, or is not, a small tumor near the uterus. Also if one is discovered, its dimensions, density, mobility, etc. Then, by exclusion, we carefully and judiciously consider the symptoms of phlegmon, cysts, fibroids, hæmatocele, etc.

These excluded, we come back in nearly all these cases to such subjective and objective symptoms, as were present in *my* patients. Each of these had usually menstruated regularly. Each had lately missed one period. Each had had many of the other symptoms of pregnancy, viz., irritable bladder, enlarged breasts, and gastric disturbance. Each had had a slight, and lately a more profuse flow of blood. Each had expelled, from vagina, shreds of flesh-like substance resem-

bling decidua. Each had an unusually thickened vaginal wall, with increased vaginal moisture, with cervix pressing forward instead of backward. Each had had almost unbearable spasms of pain in the region of one ovary. Each had greater dulness on percussion in region of pain. And in each case a small, elastic, sensitive, ovoid, and more or less movable tumor, was found in the locality where pain was most intense. With such symptoms we were justified in diagnosticating extra-uterine fœtation, and the result justified the use of electricity to destroy the life of the fœtus.

It seems by excluding some of these more common lesions in such cases, we shall be able to diagnosticate correctly the more uncommon lesion of tubal pregnancy. In the vast majority of cases the physician will naturally be led to suspect :

1st. Abortion.

2d. Periuterine inflammation.

3d. Hæmatocele and hæmatoma.

4th. Ovarian and tubal tumor, strangulated or ruptured.

5th. Displaced pregnant uterus.

6th. Membranous dysmenorrhœa.

7th. Urinary calculus.

In both of my cases I suspected abortion, and it was only after a careful physical examination, which resulted in the discovery of tumor in each case, located at the side of the uterus, that I was led to make a more thorough and systematic study of all the subjective symptoms.

It was then found that the character of the flow and pains were not typical of simple abortion, but rather of an uncomplicated tubal pregnancy.

(1) *Abortions* are frequent, while tubal pregnancy is very infrequent. The best authorities claim that about ten per cent. of all abortions occur in the first month. The symptoms of such are not alarmingly severe. The pains of tubal pregnancy, however, are alarmingly severe, not regularly periodic, but rather at irregular intervals. The first pain even, is exceedingly intense, often causing fainting. The second gener-

ally is less severe. In abortion the first pain is mild, and there is soon a slight loss of blood. The pains then gradually increase. The patient seldom looks exhausted until there has been great loss of blood. The blood in abortion is generally increased at each time of pain. In tubal pregnancy the blood comes in gushes, occasionally, and is not dependent in quantity upon the severity or frequency of the pain. The blood and membranes at an abortion may, however, closely resemble the blood and decidua of a tubal pregnancy. If possible, therefore, the membrane must be carefully examined, that no ovum may escape observation. As in abortion, it will be present, as a rule, while only the decidua in shreds or as one complete cast may be found in ectopic pregnancy. The latter, if found complete, at once settles the diagnosis. If the uterus is empty, of course an abortion is not imminent. The greatest tenderness on palpation and dulness on percussion will be over the right or left ovary in tubal pregnancy, and over the fundus uteri in an abortion.

On vaginal examination, the uterus, in a tubal pregnancy, will be slightly deflected, and a tumor or a tumefaction will be found at the opposite side of the pelvic cavity. In an uncomplicated abortion nothing of the kind is found. When this tumor is examined gently, but thoroughly, after ether is administered if needed, with the index finger in the rectum and the thumb in the vagina, if it is found just where the tube of the same side ought to be situated, we may be reasonably certain of the correctness of our diagnosis. In very thin women ballottement may be tried, and additionally confirm our opinion.

(2) *To differentiate a tubal pregnancy from* a *phlegmon*, or *peri-uterine inflammation*, the same course of examination will be required. It should be remembered that very many cases of tubal pregnancy may cause the periuterine inflammation, especially when the tube ruptures downward. Adhesive inflammation takes place between the lower border of the tube and the broad ligament before the rupture. Still, if we are called early, before complete rupture has taken place,

we expect to be able to exclude all cases of periuterine inflammation, and make a quite positive diagnosis. A few symptoms are common to both conditions, viz., pain, loss of blood per vaginam, tumor, or a tumefaction near broad ligament, uterus often displaced. But the severe pain of tubal pregnancy is paroxysmal, and occurs generally not more frequently than every three, and more commonly every five or six days. In phlegmon, cellulitis, and periuterine inflammation, the pain is continuous. In tubal pregnancy the blood comes, at times, in a gush. In these last-mentioned conditions, it is continuous, and more like a metrorrhagia. In the former, shreds of decidua may be expected; in the latter case they are never present. In the former the tumor is ovoid, symmetrical, elastic, and located in the immediate neighborhood of one tube. In the latter the tumor, if a phlegmon, is below the peritoneum, not elastic and not so sensitive; if a cellulitis, it is lower down and near to the uterus, fixed to it, and generally fixing it, not symmetrical, but often involves all of one broad ligament.

The symptoms, which are not similar, are equally important. In tubal pregnancy there is no fever at first; in periuterine inflammation of every character, there is fever before tumefaction. The phlegmon which has been present for some time, is hardly sensitive, is attended with no fever, is easily moved, is never a cause of recent unbearable pain; while in recent periuterine inflammation, the tumefaction, or infiltration, cannot be separated from the uterus. The cervix uteri and the vagina are hot and dry. The free movement of the uterus is more or less impeded; in fact, the uterus is apparently imbedded in the exudation. In periuterine inflammation, there is often much rectal tenesmus, and when the inflammation is low down complicated with cellulitis, there is generally much œdema of vulva and anus.

In tubal pregnancy the menses have skipped once, in phlegmon and perimetritis not at all.

(3) In *tubal pregnancy*, and in *hæmatocele* and *hæmatoma*, we have also many symptoms in common, and only a few

peculiar to one alone. In studying these three lesions, however, we must not forget that the grave or cataclysmic type of hæmatocele, as well as the less alarming but still severe type of hæmatoma, are occasioned by a ruptured tubal pregnancy, or to some traumatism in these parts due to the patient's efforts to induce an abortion. But whatever may be the real cause of the profound collapse which comes on without warning, save, perhaps, that it is preceded by dull heavy pain in the pelvis, the nervous shock is so severe, the pain is so intense, the pulse is so feeble, the pallor is so deathly, and the nausea, and often hiccough so pronounced, that internal hemorrhage is diagnosticated, even by the less experienced.

And it is exceedingly gratifying to know that in the profound collapse which follows the hemorrhage from a bad rupture in a tubal pregnancy, or from typical hæmatocele or a hæmatoma, even though a *pathological* diagnosis cannot always be clearly made out at the time, a *surgical* diagnosis can be made, and ought to be made. And if the alarming symptoms, the syncope, or the great prostration, the evidence of continued hemorrhage, still exists, a laparotomy is imperative, at the earliest possible moment consistent with proper preparation of the patient. But in the less severe, and we are thankful to know in the more common form of hæmatocele, or hæmatoma, we should always endeavor to be quite positive in differentiating each. In tubal pregnancy, generally, the patient has enjoyed very satisfactory health, while in an hæmatocele or hæmatoma, *not* due to pregnancy, the patient has been more or less ailing. For there must be a disease of the bloodvessels in the pelvis, if a rupture is to occur *without* a traumatism.

If a pathological condition of the vessels of these parts is present, pain and tenderness must accompany such condition. In tubal pregnancy there is not only a slight loss of blood from partial rupture of the tube from time to time, where the ovum is attached, but there is a growing fœtus in this sac which is sure to cause additional trouble. In

hæmatocele and in hæmatoma there may possibly be a slight recurrence of the internal hemorrhage at the next menstrual epoch, yet the greatest danger is passed when the recovery from the first paroxysm of pain begins.

Therefore, when called to one of these cases, this question must be answered, if possible, at a very early date, viz.: Is there a living fœtus present? Remembering what *must be done* when called to treat the grave cases of either of these three conditions, if this one case is not so alarming, we must learn the character of pain, its location, the time of its occurrence, the previous history of the patient, whether she has had pelvic trouble before, the kind, etc., the regularity of the menses for a year, or even more, the exact time the last menstruation occurred, the amount of blood and the type of pain as compared with the usual menstrual flow, the character of the reflex symptoms.

Vaginal and rectal examination will generally reveal the fact that pregnancy has, or has not existed. The careful study of the reflex symptoms will generally tell us whether the fœtus is still alive. It is possible, however, to be mistaken in this direction, as pains and tenderness and loss of blood per vaginam, and reflex gastric disturbances, and soreness of the breasts may persist after the death of the ovum, in certain cases of tubal pregnancy. The symptoms are often present from any irritation near to either ovary, and especially if the fœtus has been dead a few days and menstruation is about to begin.

If evidence of pregnancy exists we should at once exclude the possibility of a simple hæmatocele in the peritoneal cavity, or a hæmatoma in the pelvic connective tissue under the peritoneum. But if there is no evidence of a previous irregularity of menstruation, and no reflex symptoms of early pregnancy, we ought to expect one of the two latter conditions. And we ought to find, on physical examination, the positive evidence of blood in the peritoneal cavity, low down in Douglas's

pouch, or blood in the form of a hæmatoma on one side of the uterus.

In the former condition there will be considerable additional dulness on percussion in this region; there will be a sense of fulness to the parts when pressure is made in the posterior fornix. And if the blood is quite fluid, there will be the *absolute evidence* that it moves when the patient assumes the genu-pectoral position. In hæmatoma the differentiation is more difficult, but less necessary than in the true pelvic hæmatocele. The blood being in the connective tissue, generally under the broad ligament, and always extra-peritoneal, it has to dissect for itself a lodgement, and consequently it is less dangerous, never quickly becoming large in amount. (And, moreover, the treatment by electricity is quite the best treatment known for this condition.) When, however, the effusion or tumor has grown rapidly under either broad ligament, after a severe spasm of pain, which was attended with more or less symptoms of shock, but without any fever, and with the absolute absence of all symptoms of early pregnancy, we are justified in diagnosticating hæmatoma, instead of tubal pregnancy. A few days of delay will generally clear up the diagnosis. A live fœtus, in a Fallopian tube, is sure to grow, and the sac becoming tense, will cause additional trouble—the second pain will be more severe than the first. In a hæmatoma the few days of delay show the tumor smaller, less painful, and in every way less troublesome.

(4) *Ovarian and tubal cysts* if filled with water, seldom occasion such severe, sharp, and unbearable pains, as a similar tubal, but pregnant cyst. Only when incarcerated in Douglas's pouch, under a retroverted uterus, ought a mistake ever to occur. This condition is rectified, however, at once by reducing the retroversion in the most approved manner. A small ruptured ovarian cyst seldom occasions collapse, or even a slight shock, and in physical exploration often nothing is found. A pyosalpinx cannot be present unless there has been the subjective and objective evidence of formation of pus, a

rigor followed by fever, great local tenderness, often local peritonitis, dry vagina, etc. In tubal pregnancy there is evidence of pregnancy, etc.

(5) *A retroverted pregnant* uterus may have some of the subjective symptoms of tubal pregnancy. The pain in the former is constant, while in the latter it is spasmodic, and when an examination per vaginam is made the condition should at once be discovered. The tumor is posterior to and part of the uterus, not lateral. The knee-chest position cures the displacement and relieves the pain.

(6) *It is possible that membranous dysmenorrhœa* may be mistaken for tubal pregnancy, but the pain in the former comes only when the flow is about to appear or is present. The pain is more grinding and constant for one or two days, and only at the time of expected menstruation. In a tubal pregnancy the pain entirely subsides for a time, and then recurs more violently than ever. A local examination will confirm, beyond a doubt, any previous opinion.

(7) Nephritic colic may possibly be mistaken for the sharp cutting pains of threatening rupture of the tube in tubal pregnancy. There is always a possibility of differentiating the two conditions. In the former the pain starts in the region of one kidney, in the latter it is in the region of the impregnated tube. In the former the pain soon passes downward, as the calculus descends toward the bladder. The pain often radiates, however, to the abdomen and breast and vulva, but it ends when the stone passes into the bladder. In the latter the pain does not change its location unless peritonitis sets in. In the former the urine becomes dark, very scanty, only a few drops voided at once, but a constant desire to urinate, and always attended with excruciating dysuria. In the latter there is a desire to pass the urine more frequently, but it is of normal quantity. The character of the pain varies. In nephritic colic the pain is intense and agonizing, but it is nevertheless generally bearable. It often causes a trembling

of the whole body, and is attended with rapid pulse and respiration.

In tubal pregnancy the patient is suffering from a more profound collapse, the pulse and respiration are rapid, but the temperature is not elevated. The reflex gastric symptoms may be quite similar. The previous history will generally help in the former condition, for it will be found that there have generally been dysuria, bloody urine, a pain in the labia majora.

In the latter the history is that of early pregnancy. But physical examination per rectum and vagina must be made to be absolutely sure of a diagnosis. In the former condition nothing is found but a hyperæsthesia of the parts. In the latter the local evidence of tubal pregnancy, with the fact of a condition of amenorrhœa, must be sufficient to clear up a diagnosis.

Treatment. — From a careful study of my own and the many other cases of ectopic pregnancies reported during the last few years, and collected and arranged for me by my friend Dr. Tompkins, I believe I am justified in saying with Thomas, "If a diagnosis is made before the fourth month use electricity;"[1] and with Garrigues, "If the diagnosis of extra-uterine pregnancy is made early the treatment is electricity."[2]

I would add, however, this qualification, Avoid electricity if severe internal hemorrhage has already taken place.

We have no less than twenty cases of ectopic pregnancy of the ninety-seven cases reported during the last three years, which have been treated by electricity. Of these twenty cases, there were two deaths. But one of these patients was suffering at the same time from an acute attack of gonorrhœa, and should, therefore, have no weight in making statistics. The other death was the patient of Dr. Janvrin, and, as you all remember, she had a profound collapse for two hours, and this was followed by localized peritonitis, before electricity was resorted to. After death it was found that she had had,

[1] Trans. Amer. Gynecological Society, vol. vii. p. 235. [2] Op. cit., p. 154.

before using electricity, a rupture of quite a large artery, with consequent internal hemorrhage. Certainly this was not a case for electricity, but for laparotomy.

Is it probable that as many women would have recovered under any other treatment, even with the best laparotomists?

In these twenty cases electricity was applied during the second month in three cases; third month, six cases; fourth month, two cases; fifth month, four cases.

In two cases the period of utero-gestation is not stated.

In two cases galvano-puncture was applied, with one death.

We have, therefore, twenty cases with two deaths; both deaths not due, probably, to electricity. In other words, in eighteen uncomplicated cases of ectopic pregnancy, electricity destroyed the life of the fœtus, and the patient recovered.

Only this week Prof. Rockwell, of the New York Post-graduate School and Hospital, and for many years electrician to the New York State Woman's Hospital, informs me that he has used electricity for destroying the life of the extra-uterine fœtus in thirteen cases, and always successfully. The only case in which an accident followed the use of electricity was Dr. Janvrin's, and there had been a rupture of quite a large artery two weeks before using electricity in this case. And, furthermore, the patients have all been well since, with this one exception mentioned.

Many of these patients were attended by careful, well-educated physicians, where an error in diagnosis is very doubtful.

I would not oppose an experienced, judicious operator in his decision to do a laparotomy in cases in which, undoubtedly, electricity would meet all the required indications, but I would most decidedly oppose an inexperienced operator in a similar decision.

We, who have treated the most dangerous cases by both methods, are not to limit the sphere of experimental usefulness of a Tait, a Martin, a Battey, a Goodell, or a Thomas, but rather to establish certain broad rules for the general practitioner, respecting the treatment of tubal pregnancy.

Many of the physicians who successfully treated these eighteen cases, never saw a laparotomy. Many of their patients were too poor to employ a skilled laparotomist in council, or to bear the expense of a journey to the nearest city hospital, and nearly all were too critically ill to risk such a journey.

And, furthermore, *if an error of diagnosis has been made*, the method of treatment here advocated for early tubal pregnancy *with the least grave symptoms*, cannot possibly do harm, and, in fact, is the accepted method of many of the best gynecologists of to-day, for the treatment of many of those conditions which most resemble tubal pregnancy. And still, again, if electricity does not destroy the fœtus, it, the fœtus, can be removed by laparotomy more safely after its use than before.[1]

Several very valuable articles on the use of electricity in gynecology have been lately written. Those of our Fellows, Engelmann, Mundé, etc., are not the least important. Ford (*Med. Press of Western New York*, April, 1888) has advanced one idea which seems of great interest to me. It is this: "That tissue is destroyed by electricity in inverse ratio to its degree or grade of vitality." Such a rule would most surely explain the certainty and rapidity with which electricity destroys a very young fœtus, and the difficulty or the amount required of electricity to destroy the life of a fœtus in pregnancies further advanced.[2]

A recent writer (*N. Y. Med. Journal*, August 4, 1888), in discussing the subject of diagnosis and treatment of ectopic pregnancy, states, "Nor do I believe such a case (tubal pregnancy before the fifth month) can be diagnosticated with absolute certainty, unless the membranes expelled are proved to be decidua by microscopical examination; neither the subjective nor the objective symptoms are pathognomic. The same *rational* and *physical* signs are observed in *other cysts, tumors*,

[1] See London Lancet (Dr. Jones's case), 1887, p. 608.

[2] Van de Warker's case, Trans. Amer. Gyn. Soc. 1887; Chadwick (loc. cit.).

and *deposits* in the pelvis.[1] "But *conceding* that we may sometimes diagnosticate tubal pregnancy in the early months, before rupture of the sac, I maintain that abdominal section is preferable to electricity."

His reasons are (1) "because the sac and contents may occasion future trouble;" (2) "the placenta may continue to grow." Neither of these conditions has ever followed the use of electricity when the fœtus was under four months. And what shall we say of his advice *to do a laparotomy* for a pathological condition, the diagnosis of which, he states the moment before, *cannot be made.* It is no wonder that Dr. Thomas Keith has said in a recent number of the *British Medical Journal*, "Responsibility seems to have become old-fashioned and gone out of date in abdominal surgery."

In the discussion of Dr. Aveling's paper (*Trans. Br. Gyn. Soc.*, May, 1888), which is an eminently just and conservative study of the advantages of electricity over all other methods for the treatment in *early* extra-uterine pregnancy of the less grave type, the same objection is made, and the only evidence adduced in support of such objection is that *after an abortion* not a tubal pregnancy the placenta had been known to grow.

In Dr. Janvrin's case the woman died after using electricity. His case, however, was one for laparotomy, not electricity. There was undoubted rupture of, and hemorrhage from, quite a large artery, as it took two hours to bring about a reaction from the profound collapse which came on while he was by her side (*Trans. Amer. Gyn. Soc.*, vol. ii.) In Buckmaster's case (*Med. News*, July 21, 1888), I believe a large rupture had taken place, and the symptoms had been and were so grave that I should not have advised electricity, but rather laparotomy. Still the patient recovered.

We must, therefore, remember that when the symptoms in tubal pregnancy are the symptoms of the so-called cataclysmic hæmatocele, we must be prepared to do a laparotomy. It is

[1] The italics are mine.

equally important, however, to remember that in many cases the larger number of early tubal pregnancies are diagnosticated, when the symptoms are *less grave*, and in *these* cases the use of electricity is justified, and should be resorted to. And if the operation with the knife must be done later, there will be less danger after the death of the fœtus.

The safety of the patient demands the death of the ovum as soon as diagnosis is made, if the pregnancy is less than three months. Later a laparotomy must be done if the symptoms demand it. The cases of ectopic pregnancy which have passed into the fourth month, if the symptoms are still severe, should be treated by laparotomy and the removal of sac and contents. The fœtus is too large to allow its retention in the pelvis after death. Sooner or later the bones will undoubtedly cause trouble, and find their way into the vagina or rectum, and in their expulsion the patient will be in as great peril as from a laparotomy at an earlier date. The cases which are attended with the grave symptoms, the profound collapse, demand immediate treatment by abdominal section, and the bleeding vessels secured, and the fœtus and sac removed in the most approved manner.[1]

Of the ninety-seven cases heretofore mentioned, there has been a surgical operation of some character in forty-six cases. In these forty-six cases there were fourteen deaths. In these forty-six cases twenty-six laparotomies were performed before the end of the ninth month. Of these twenty-six laparotomies during the viability of the child, there were six deaths, or twenty-four per cent.

Of the twenty-six laparotomies, sixteen were operated upon before the end of the fourth month, with but two deaths. Eight of these fourteen successful cases were Mr. Tait's.

Ten of the twenty-six cases were operated upon after the fourth month, and before the tenth month, with four deaths; forty per cent.

[1] See Dr. Thomas's case, No. 12, Trans. Amer. Gyn. Soc., p. 882 and p. 225. See Chadwick's case (loc. cit.). Coe's case, New York Obstet. Soc., 1888.

In eleven of the forty-six cases the time of operation was not given. Six of these eleven patients died.

Three operations were through the vagina, with two recoveries, one death.

The fact that a Martin, a Tait, an Edis, or a Janvrin advocates laparotomy for the relief of tubal pregnancy, does not make the operation free from danger; since Martin has lost one in nine, and Tait two in thirty-five. The operation is not "simplicity itself." The best of operative skill is needed for success in the most promising cases. It must be done at once, or as early as may be possible, when grave symptoms have indicated that hemorrhage has occurred, for, according to Mr. Tait's statement, 90 to 95 per cent. of these grave cases die if not operated upon early.

The cases which have passed beyond the ninth month, and in which the fœtus is dead, must be treated on general principles, each case demanding an operation as soon as the general health of the patient begins to be impaired by the presence of the offending body. The operation must be varied as the indications in each case may suggest.

Another class of cases is sometimes found, where the pregnancy has gone on past the fifth month, and the patient is able and willing to bear the pains, and desires to have a child, and, for the sake of a living child, will share some of the responsibility. The wise physician should be prepared to operate at any moment, but may allow the pregnancy to go on, hoping he may be able to operate at the seventh month and save both mother and child.[1] Harris, in a recent number of the *American Journal of the Medical Sciences*, records thirty abdominal sections for removal of living children. Five mothers and eleven children lived. In a few more years even better results than this should be attained.

The rule which must ever be in our minds, in deciding upon

[1] See Mr. Tait's case.

a course of delay in these cases, is, to be sure the fœtus has escaped from the *tube*.

Conclusions.—From a careful study of these cases, I believe we may be justified in adopting the following rules for our guidance in the management of ectopic pregnancies:

1st. *Electricity.* If the diagnosis is made during the first three months, and if the symptoms have been only the early or *premonitory* symptoms of rupture, use electricity.

2d. *Laparotomy.* If the diagnosis is not made until the fourth month, and the severe symptoms continue, do a laparotomy, and remove the sac and contents in the most approved manner.

3d. *Laparotomy.* If a diagnosis is made at whatever stage of ectopic pregnancy, and if the symptoms are alarming, and undoubtedly due to rupture and loss of blood, do a laparotomy at the earliest possible moment consistent with the patient's ability to endure an operation.

4th. *Delay a laparotomy until the seventh month.* If the diagnosis is made after the fifth month, and the symptoms are less and less severe, the fœtus undoubtedly not in the Fallopian tube, and the patient is anxious to bear a living child, and you are prepared to watch carefully the patient, and be ready to meet, by laparotomy, at a moment's notice, any emergency which may arise, then delay is justifiable until the child is viable, in order that a laparotomy may be performed with the possibility and probability of saving *both* mother and child.

5th. *Operate in best manner for removal of dead fœtus.* When the pregnancy has continued beyond the ninth month, and the fœtus is found to be dead, the *amount* and *character* of *general* and *local disturbance* occasioned by the dead fœtus must determine when an abdominal section should be made, other operations performed, and the offending body removed.

DISCUSSION.

Dr. Harvey, of Calcutta.—Mr. President and Gentlemen: It is to your courtesy rather than to any special knowledge of this subject that I am called upon to speak. Laparotomy is an operation which is absolutely in its infancy in India, where my life is cast. We are considering it, but hitherto it has been very little resorted to. When the people of India recognize that it is justifiable and successful they will come in hundreds and thousands, but they are very conservative, and it is difficult to induce them to submit to any operation of which they have not heard. So our abdominal sections there are still in their infancy, and I have never yet had occasion to operate myself in a case of ectopic gestation. I have seen, however, several cases, most commonly in the post-mortem room, and I have paid considerable attention to the subject. I am quite convinced, in my own mind, that the labor of American physicians has gone quite far enough to prove what has been attempted at a very considerable expense by Englishmen, that electricity can, in certain cases, kill the fœtus and lead to favorable results and save patients from the danger of abdominal section. I agree with the last speaker, that what is permissible for a Battey or a Thomas, is not judicious in the hands of a general practitioner. A man who is not in the habit of performing this operation has no idea of the extreme difficulty involved in everting the sac and getting it out through a small opening in the abdomen.

There is one thing I am quite sure of, and that is, that we all agree as to the absolute futility of the expectant treatment in these cases. There is no doubt that sometimes, if nothing is done, the fœtus will occasionally die and be extracted from the bladder, or abdominal wall, or what not, but the vast majority, if left to themselves, will eventually die. I remember a sad case where a lady, three hundred or four hundred miles from Calcutta, was seized with symptoms of tubal pregnancy. I did not succeed in reaching the station until forty-eight hours afterward. By this time all the symptoms of collapse had passed away. The patient was quite comfortable, and could not be induced to believe that anything serious was the matter. I was in consultation with an

intelligent man who had had no experience in abdominal section. I explained the case, and they decided against any interference, the condition of the patient being such that they could not believe that she was in such imminent danger, and it was decided that instruments should be left, and that if necessary my colleague, with whom I was in consultation, should proceed to operate. I returned to Calcutta, and two days afterward the symptoms recurred and the patient, a most accomplished lady, died. I have not the least doubt that, had the abdomen been opened, the sac removed, and the abdominal cavity washed out, that life would have been saved.

I had the privilege of seeing a precisely similar case operated upon by Dr. Tait. The woman was admitted, and I was invited to see her. I said, "What is this?" "Oh," he says, in his easy way, "I think it is a ruptured tubal pregnancy, but we shall see when we get inside." He made the usual small incision, enough to admit two fingers, and said, "Yes," and then proceeded to extract the mass, which you would hardly imagine could come through so small a hole. He then washed out the cavity with repeated pourings in of common water and closed the wound. The woman made a good recovery.

I think the last paper summed up the general rules that should be followed in such cases: I think the objection to electricity, which has hitherto been raised, has been due to the fact that in these cases you are never sure but hemorrhage may occur and prove fatal before it can be reached. The operation in the hands of Tait, or Thomas, or Battey, is almost void of danger, but it is a very different thing in the hands of the inexperienced.

Dr. J. C. Reeve, of Dayton, Ohio.—I wish most heartily that I could present anything on this subject commensurate at all with its practical importance or with the rapid advance which it has made. Certainly, I can speak on one point, and that is a hearty congratulation for the amount of work on this subject which has been shown here to-day. And I know of no other subject connected with gynecology—a knowledge of which has been so much advanced by this Society—as extrauterine pregnancy. I find here to-day a striking illustration of the advance that has been made. Five years ago, I had the honor of presenting to this Society the fourth case of extrauterine pregnancy that had been

cured by the application of electricity. If I had another case of extrauterine pregnancy, I would not report it for this reason: it would be said, as was said then, diagnosis was imperfect. Because one symptom was absent they said my diagnosis was imperfect. I had all the usual symptoms of pregnancy; I had the decidua so perfect that I could draw it on my finger like a thimble, and yet, because I had no ballottement I was told that I did not have extrauterine pregnancy. Now, we have not had ballottement mentioned here to-day, and nothing said of it being a *sine qua non.*

There were two points which struck me in the case I observed, which I do not think were alluded to by the authors of the papers. The first is the vascular action that was apparent to the touch upon examining the cystic projection into the vagina. I did not hear Dr. Janvrin's paper, and I understand him to speak of congestion, but this was a peculiar congestion which I never saw in any other form of pelvic disease. It was pulsative; you could feel the pulsation as a marked symptom of that projection into the vagina. The other point was the rapidity of change which took place in the growth of the tumor. You could absolutely feel the increase, as Dr. Thomas remarked, in a week.

Now, in regard to the treatment of extrauterine pregnancy. It seems to be an unsettled question; there are arguments on both sides—in favor of electricity, and in favor of laparotomy. In considering these arguments, I certainly cannot give any weight to the argument that the destruction of the fœtus by electricity may leave some remnants of the tumor behind, which cause after-trouble, presented by the gentlemen in favor of laparotomy. I may be mistaken, but I cannot find a sufficient number of instances where this has occurred to make the objection valid. As a theoretical consideration, I would not give it any thought at all. If there are facts, let them be presented. We have not had enough experience to be sure that in some instances there may not follow bad effects from the contents of the sac or cyst which are left behind, and just here is the dividing line between our sure knowledge and what is unknown, and it is well to mark that line and see in what direction to look for further information. Of course, having had one successful case

of the destruction of the fœtus and cure by electricity, my feelings could not but be strongly on that side of the question.

There is one point, that was very well presented in the report of one of Dr. Hanks's cases, that struck me as in accordance with my experience, and that was, the suddenness of the cessation of symptoms after the application of electricity; the current had an immediate beneficial effect; it was evident right away. I made in my case six, eight, or ten applications of electricity, but I continued so as to be on the safe side. I saw the effect of it in this case after the second application. I used the galvano-faradic current. That is a very strong point in doubtful cases, it seems to me, in favor of the application of electricity. A few applications may be made and the effect noted. Cases will be doubtful, even to experienced men, and very few men have large experience with extrauterine pregnancy. Then would it not be a strong point in favor of making applications of electricity, even when the case was under advisement.

In regard to the point presented by Dr. Hanks, that electricity is adapted to the general practitioner, while laparotomy is not—that has been fully presented by him, and I need not enlarge upon it. At the same time, while feeling strongly from my own experience, and having, theoretically, a very strong bias in favor of the application of electricity, I should not feel at all like censuring anyone who should prefer, in our present state of knowledge, to resort to laparotomy. The question is still under our advisement.

There is one other point which I do not think has been presented: Why may not the application of electricity bring about, at the time, just the very thing which it is used to prevent—that is, the rupture of the cyst? We know the condition of the tissues there, and that rupture is likely to take place, and why may not the passage of electricity produce a rupture and bring on collapse, and we incur the odium of having killed our patient? I have made up my mind to this, that I should never apply electricity for extrauterine pregnancy unless the condition of the patient was fully explained to her friends, and unless I had my instruments ready for laparotomy, where I could get at them at brief notice. Of course, for the rupture of the cyst, laparotomy

is the treatment, and, it seems to me, the accident may be brought about by the perturbative action of the electric current.

Dr. S. C. Gordon, of Portland, Maine.—Mr. Chairman and Fellows: I wish first to extend my thanks to the Fellows of the American Gynecological Society for making me a member of this Society. I came into this Society according to the plan suggested by your President: waited until several members had invited me to come. I now have the honor of being the sole representative of the State of Maine. I have, however, the great pleasure of seeing before me two members who claim that as their native State, so we may say Maine has three representatives in this Society.

In regard to this matter under discussion, there are two points connected with Dr. Hanks's paper which I wish to notice. The first is this: Dr. Hanks reports two deaths out of twenty cases treated by electricity. He reports two deaths out of sixteen cases in which laparotomy was done. It seems to me, assuming, as Dr. Hanks does, that ninety-five per cent. of all cases can be diagnosticated, that these two statements are quite remarkable. It certainly must be known to all who have made any operations in this direction, that in a great many of these cases in which we operate, we are very often called much too late to save our patient. In my own case which I reported in the early part of the year—which I operated upon a year ago the 24th of this month—I was obliged to go from my own city of Portland, which took me all night long, and did not operate until almost sixteen hours after rupture had taken place, and my patient got well. In my own city within a few months afterward, a colleague of mine had a case in which exactly the same symptoms ensued that occurred in my case—as nearly as two cases could be. There were certain delays incident to his case, and although the operation was made the patient died. Now a great many such cases as this must occur, in which it is impossible, perhaps, to obtain the necessary skill to make the operation, and your patient suffers. If ninety-five per cent. can be diagnosticated before rupture by men who have the "skill of an ordinary practitioner," are not we running a great risk, by waiting, when we all admit that hemorrhage is liable to occur at any time, and this state of things may be fatal and our patient lose the advantages of operation?

Then, again, out of the thirty-one cases reported, treated by electricity, thirteen got well. Now, the difference between life and death is not always so very great as to make it desirable to live. Dr. Reeve asks the question, What is the subsequent history of these cases that have been cured by electricity? It seems to me that Dr. Reeve must have read the literature of the subject to but little advantage, if he does not know of plenty of cases in which we have had a protracted period of absorption and purulent infection; ulcerations of the mucous membrane, with a discharge of pus, and a long, lingering life, which is worse than death. It seems to me, with the means of diagnosis, if we can call it diagnosis, that certainly the safety of our patients demands abdominal section—the only absolutely safe method of treating this class of cases.

Dr. A. W. Johnstone, of Danville, Ky.—I have been greatly interested in this subject for the last few years, as I was the first in America to have a success in one of these ruptured tube cases.

In regard to the specimen which Dr. Mann has shown us, I do not know but I owe him an apology, but I am free to confess that I believe the cyst he shows us is a dermoid. In the last *British Gynecological Journal* is an article on "Ovarian Dermoids," by Mr. Bland Sutton, in which he demonstrates that the difference between an ovarian and a dermoid cyst is only one of degree, that they shade off into each other, and that you may expect almost anything in a dermoid cyst. Thus, I found post-mortem in a case of my own, liver tissue in a cyst of one of the ovaries, and a well-formed upper jaw, with teeth, in the other. The fact of finding even placental tissue in an ovarian cyst does not prove that it is an ovarian pregnancy. What I want to show is, that an ovarian cyst is a great deal more vascular than the one which has been shown us. If this tumor was a pregnancy you would see great sulci running through it, and, in spite of the hardening of its preservative fluids, you would find immense sulci where the old veins and arteries used to be. I think that what he shows us is simply an evidence of the different tissues you always find in dermoid cysts. I do not think that it can be set up as a proof of the existence of ovarian pregnancy.

I think, if we carry in our memory, just as a rule of thumb, the idea that whenever we come in contact with extra-uterine

pregnancy it is most apt to be a rupture, we would conclude that if you delay, you go a good way to invite disaster. Last spring I had a letter from Lawson Tait on this subject, answering some points which I had written to him about. He said he had seen seventy cases of extra-uterine pregnancy, and only one of them had he seen before rupture. The point of this letter, however, was to prove a point that I tried to get in at our last meeting (which the President shut out), and it was this: that nearly always these painful shocks are nothing more or less than rupture. In these cases it nearly always means rupture. Last year I had a case in which the patient had three separate and distinct shocks and at operation I found three separate clots; an old, hard, dried-up one, another one discolored, and, lastly, fresh clots. I had seen this condition quite frequently, in assisting Mr. Tait in his operations, but to make sure I wrote to him about it, and he wrote back, saying, most certainly, you do have this condition; that each rupture records itself in the character of its clots. And you seldom open an abdomen that you do not find a proof that there is more than one rupture. If we will think of that, we will act on Dr. Janvrin's experience, and never use an electric battery. Dr. Price was the first one that ever removed a sac where there was no rupture. When you come to think of the condition of the vast majority of cases, where you pass an electric current, you will realize that you not only pass it through the sac containing a living child, but also through the peritoneum already irritated with effused blood.

As to the subsequent growth of the placenta, in this paper which I referred to, the ground was taken that it was not only necessary to kill the child, but to kill the placenta also, which is a separate growth from the child. For have we not all seen miscarriages in which there is a great disproportion between the development of the fœtus and of the placenta itself? In order to arrest extra-uterine pregnancy, we have so to shock the pelvic sympathetic, as to produce in a normal pregnancy an abortion; and you can see for yourself that the process must be a dangerous one.

Dr. Reeve raised the point whether there ever was any disastrous results after the fœtus is killed. I forget whether Dr. Chadwick told us last year he had used the electric battery or

not, but in one case he knew the diagnosis of extra-uterine pregnancy was proved by performing laparotomy after suppuration. It is infinitely more dangerous to leave anything there to suppurate when it can be taken out with the knife.

So my idea about the electric battery is, that it is not only wrong in principle but dangerous in practice, and disastrous in its results. This is shown by the lithopædia, which is the end to which all these tentative operations lead. After the lithopædion once begins to form, absorption cannot take place, and suppuration may occur at any time. Even after you have reached this lithopædion, the woman is not safe, for she is carrying that around in her belly, which I think is as dangerous as the extra-uterine pregnancy itself. In the old times there were a great many more lithopædia than at present. When the child is dead the patient is not safe; she is carrying a dynamite cartridge around in her that may explode at any time, and the only safe way is to make a clean sweep of the whole thing. I believe all such cases, if they knew they were to live on and then run the risks and discomforts of a suppuration, would much prefer a laparotomy.

Dr. C. Kollock, of South Carolina.—In the latter part of May, 1886, I was called twenty-five miles from my home to see a patient. There were two young doctors in charge of the case, and they said it was extrauterine pregnancy. I said, "I think it is." There was no chance to operate, as she had just had shocks. About two months afterward she had another shock, and I was sent for again. It was twenty-five miles distant and I could only go fifteen miles of the way by rail. I started immediately, but when I got there she was dead. On post-mortem examination we found evidences of two distinct hemorrhages, the one from the shock which occurred in May, dried and hardened; and the other fresh one, which had just occurred on that day. There were no adhesions, showing that she could have been relieved with safety by laparotomy. For that reason I agree with Dr. Johnstone, that whenever the fact is established that it is extrauterine pregnancy, I should say a laparotomy ought to be performed rather than an application of electricity. This destroying the life of the fœtus, leaves so much dead matter in the cavity which can be gotten rid of only by absorption, thus subjecting the patient to the risk of septicæmia.

Dr. G. J. Engelmann, of St. Louis.—Dr. Wylie desires to be put on record in this manner: "I think there is no doubt that the diagnosis of extrauterine pregnancy is very uncertain, but where a diagnosis is made I would advise laparotomy, as this makes the diagnosis certain, and if the tube or sac has not ruptured, the danger from the operation is very trifling; after rupture, laparotomy is the only safe way of cure. Electricity may kill the fœtus, but it does not insure safety for the future, and while electricity is being used—during this delay—rupture may take place, and thus add greatly to the danger of laparotomy, which in most all cases ought to be done at once. I am certain that some cases which have been treated by electricity were not extrauterine pregnancy as supposed, for I have myself seen post-mortems, in three such cases, in which the mistake in diagnosis of extra-uterine pregnancy has been made, and electricity used, and one of these cases has been recorded as a cure by electricity."

If I may be permitted to do so, I will say a word upon this point. This, like so many of our medical discussions, is of too general a character, and the statements made are too sweeping by far. To my mind the question is not, which is the preferable treatment, electricity or laparotomy, but what are the conditions indicating the one or the other. Laparotomy is undoubtedly the proper course in a certain class of cases, but, on the other hand, are there no cases in which electricity could properly be resorted to? To my mind, these are the very early cases, which, as the gentlemen say, we do not see. The specialist does not see them, but the family physician is liable to be consulted in regard to them. He sees them when they are still difficult to diagnose; he sees the early stages when he is called on account of irregularity of the menses, discomfort or pains, when the diagnosis is an extremely doubtful one; but are not those the cases, is not this the period, in which electricity is indicated and should properly be used? If it is a thickening of some kind, an induration or extravasation with some menstrual disturbance, and not, as supposed, an extra-uterine fœtation, what harm can come from this treatment? It is beneficial in either case; if it destroys the embryo, it destroys it at a very early stage, when its death will probably be followed by absorption and not by serious

consequences of any kind. I believe these to be the proper cases in which to use electricity: the very early stages, which rarely come into the hands of the specialist, but which are seen by the general practitioner, should be treated by electricity. Even in doubtful, very doubtful, cases there is no reason for delay: no harm is done by this procedure; if some thickening, or a resistance, an infiltration is found, it may be used with benefit. If the case is one of extra-uterine pregnancy and the current kills the fœtus, it is not liable to lead to suppuration, but to absorption. The gentlemen have spoken of electricity, but have not specified whether they resorted to galvanic or faradic; and this is important as the action of the two currents is a very different one: while the faradic causes contraction of the muscles, and rupture of the sac in that way, the galvanic, if not interrupted, would have no such effect, but would, if of sufficient strength, have an electrolytic action. If electricity is to be resorted to at all, and any benefit is to be derived from its use, we should know which current to use, and how to use it.

Dr. H. C. Coe, of New York.—I would like to say in regard to Dr. Johnstone's opinion of the specimen which Dr. Mann has presented, that I think the presence of placental tissue in a dermoid cyst must be *rara avis*. Everything turns on the microscopical appearances in this case. Either a placenta is, or is not there; if it is, I cannot very well conceive how it could come there in any way but as a product of conception.

About six weeks after Dr. Hawley's primary laparotomy for tubal pregnancy, I assisted him at a second successful one. The patient was in the hospital for two weeks, and was examined by many physicians. There was little doubt about the diagnosis, and the operation was performed for the purpose of removing the sac before rupture took place. At the fourth or fifth week, the patient had had a sudden collapse in the street, from which she recovered and was able to go about. The sac was found enclosed in an old blood-clot, showing that rupture had really occurred before the operation.

In reference to the question of diagnosis, I think there is a great deal of truth in the point which Dr. Wylie raised, that in some cases positive recognition of the condition is impossible. It is difficult in some cases to get a clear history. I recollect a

case last spring to which I was called in consultation about midnight, where there was no history which pointed to extra-uterine pregnancy. It was to all intents a normal pregnancy with a retroverted uterus. The patient suffered a sudden collapse, and when I saw her she was apparently moribund. Her condition was such that any operation was out of the question. She afterward recovered, and about a week ago she still had a mass about half as large as my hand behind the uterus. I supposed, at the time, that it was a case of extra-uterine pregnancy, but as a placenta came away the day after the accident, it was evident that it was one of hæmatocele from rupture of dilated veins in the broad ligaments.

In a typical case, diagnosis is easy, but when the case has not been under observation, or where, through lack of intelligence on the part of the patient or her friends, the history is incomplete, there is sometimes considerable doubt about the diagnosis.

Dr. Tyndall, of Charleston, S. C.—Mr. President, I feel very much complimented and obliged to you and your Fellows, but I have very little experience—I may say none—in regard to the operative procedure. Some six weeks ago I met with what I believe to be the first case of extra-uterine pregnancy that I was called upon to see personally. I was called to treat a patient for sterility, an unfortunate woman of thirty, who had been married seven years and had never conceived. Upon examination I found such a degree of stenosis of the os that I resorted to treatment by forcible dilatation. The patient, after being treated for a few weeks, went out of the city and remained away for two or three months. She came back, after having passed several weeks over her menstrual period, and believing herself to be pregnant. About this time, when I was congratulating myself on the result of the treatment, I was called to see her at night, her husband stating to me that she had had a miscarriage, and wanted my attention immediately. I was with her in a very short time and found there had been a good deal of abdominal pain, bearing-down pains, and in some of the discharges I found a portion of what seemed to be deciduous membrane. The hemorrhage, which was not active, had stopped, but the patient presented a degree of collapse which was unusual. Upon examination I found no dilatation of the os, but in order to

relieve the suffering I injected one-third of a grain of morphia hypodermically, and after a while left her for the night. I saw her early the next morning and found she had slept very little, and still complained of uneasiness about the pelvic region ; there was no more hemorrhage, but considerable rapidity of pulse. I again suspected that there was an extra-uterine pregnancy, and that there had been a rupture. During the course of the day my patient suffered from repeated vomiting, the pulse was more rapid and frequent, and there was a pallor about the skin. That continued over that night, and she died the next morning about eight or nine o'clock. I had no opportunity of making an autopsy, but I believe that a diagnosis of extra-uterine pregnancy in that case was correct. The case was so rapid and so uncertain as to diagnosis, that the question of operative procedure was not at once entertained. I did entertain it later, and told the husband, but before I could operate the patient died. That was my only experience with extra-uterine pregnancy.

I saw a case of a personal friend of mine which resulted in the emptying of the abscess and the discharge of the fœtal remains through the rectum and the abdominal parietes.

In regard to the question now agitating the profession, as to the relative advantage of treatment by electricity, and of laparotomy, it is a matter, of course, which, as many of the gentlemen have remarked, I think must depend a good deal upon circumstances. But it is very clear at the present day, when operative procedures have become more settled, and when there are so many more skilled operators than formerly, and we take the broad ground as to the relative advantage of electricity—it is very clear, from a surgical standpoint, that early operation is best. Still, it is true, there may be some cases in which the life of the woman after treatment by electricity has been a life not altogether of disease. Evidently those are the exceptional cases, and the question of subjecting them to the risk of running the chances of disease, I think, must depend simply upon the surroundings, the experience of the surgeon who has them in charge, and his feeling that he is not prepared for a radical operation. On the other hand, if the surroundings are suitable, I think it will, if not now, very soon, become an established rule that the operation by laparotomy is the one to be preferred. The patient

under these circumstances is one that is often seen by the surgeon, when he has to deal with residuary abscess. The abscess treated by the surgeon disappears sometimes, and the patient gets better; but after a time there is, perhaps, a rekindling from the presence of some foreign body or the presence of some microbes there. Nevertheless, there is a weakness of the tissues in every woman in whom there have been an extra-uterine pregnancy and death of the fœtus. I think she is exposed to that pathological state. There is a physiological weakness of that part, and after her menses, or in connection with a subsequent pregnancy, she is liable to have a volcanic eruption there, and death generally follows.

Dr. Kollock referred to a case in which he made an autopsy where there were two hemorrhages, one in May and one in July, that, I think, he could hardly make clear. There may, perhaps, have been two hemorrhages, or the woman may have had two extra-uterine fœtations.

Dr. A. Palmer Dudley, of New York.—I hope in the discussion of this subject, that what seems to be the most important part of it will not be neglected—that is, the early diagnosis. The gentlemen have been discussing electricity and laparotomy, and I feel certain that the younger men will go away feeling uncertain about the early diagnosis, after Dr. Hanks having stated that ninety-five per cent. can be diagnosticated, and Dr. Johnstone having stated that diagnosis cannot be made until rupture has taken place; that Dr. Price was extremely fortunate that he met a case of extra-uterine pregnancy, but when he operated he operated for pyosalpinx.

Now I think it is an easy matter to treat a case, after a diagnosis has been reached, either by electricity or laparotomy. In none of the remarks have the gentlemen told us how we can get as nearly as possible to a positive diagnosis. Dr. Janvrin has said that the increase of the breasts, the vomiting of pregnancy, a sharp pain in the side, or enlargement in the side with pulsation and an exquisite tenderness—that if you see all these signs, you may be pretty certain you have extra-uterine pregnancy.

A patient, seventeen years of age, who had been married clandestinely, and who had suffered a miscarriage, came to my clinic some time ago. She had been forbidden to see her husband, but

had met him clandestinely and had cobabited with him, and she feared pregnancy. I examined her carefully and found she had every symptom of pregnancy; the increased breasts, contracted nipple, vomiting, exquisite tenderness in the left side, with an enlargement that seemed to be a new formation. A pulsation beneath this growth, and the statement that at her last menstruation she had thrown out pieces of tissue, led me to believe that it was a case of extra-uterine pregnancy, so I put her in the hospital. I made an abdominal section, and found a tube enlarged and distended on the left side, bound to everything around it; the intestines were somewhat adherent and I considered I had made a mistake. In my efforts to get that tube loose I poked my finger through a parovarian cyst and down so far that my assistant's finger, in the vagina lifting up the tube, felt to me as if I had struck it without any tissue between. There is a case with every symptom which the gentlemen have set forth in their papers as symptoms given for extra-uterine pregnancy, and still you can see what I had. I must believe that it is a difficult matter for the best diagnostician to make a definite diagnosis of extra-uterine pregnancy until he gets the symptom of shock, which is the symptom of rupture. If this is the case, and we use electricity, how do we know that we have a case of extra-uterine pregnancy? There are many pathological conditions of the tubes, and ovaries, and the broad ligament, that will be relieved by electricity, and will be the turning-point with the patient whereby she will recover; but when we all know that an exploratory incision can be made with very little danger to the patient, is it not better that we should give the patient the benefit of the doubt, and make a simple exploratory incision and settle matters, even before rupture, and not run the risk of using electricity, and possibly putting the patient in the danger shown us this afternoon? I wish some of the gentlemen who have had experience, would, for the benefit of the young men who get cases like this, give us some positive means by which we can recognize the condition, and if we are not able to operate ourselves, to send the cases to them, so that they may relieve our patients.

Dr. Mann.—I have only a word to say in regard to my specimen. Dr. Johnstone has made a statement that this might

be a dermoid cyst. That seems to me a rather remarkable statement, for I am sure no case has ever been reported where placental tissue has been found in a dermoid cyst. His argument that because somebody has stated that a dermoid cyst may contain anything, and, therefore, placental tissue; and that as this contains placenta therefore it is a dermoid cyst, is very weak. The absence of sinuses in the specimen may be explained by the fact that the fœtus died some time before it was removed, and we all know these sinuses are closed even in the uterus when the fœtus is dead.

Dr. Kelly, who was obliged to leave, wished me to say that he operated three years ago for extra-uterine pregnancy, in the fourth month, where he had made a previous diagnosis of extra-uterine pregnancy; he operated for the removal of the cyst, and the operation was successful.

In regard to the treatment by electricity, Dr. Johnstone says we may expect in these to get a lithopædion. If we take the cases early enough, I do not think we are in any danger of a lithopædion. I have seen several cases, and in each case the cyst was absorbed down to almost nothing. Dr. Johnstone also said that a woman who had a lithopædion was in as much danger as if she was carrying a dynamite cartridge about with her. I know of a case in which a lithopædion has existed for ten years. The woman is the picture of health, does all her own work, and has borne three children. The diagnosis was made by a former member of this Society, Dr. James P. White. It is exactly the shape of the fœtus, rises above the uterus, and does not change from year to year.

Dr. Janvrin.—In reference to my case, which died from hemorrhage after using galvanism, I will say that the first attack of pain, in which there was a hemorrhage from an artery on the surface of the tube, was no more severe than the symptoms which Dr. Hanks has described as obtaining in his own second case; no more severe than other cases that have been treated successfully with electricity. Nevertheless, I am very sorry that I did not perform laparotomy in that case—I think it ought to have been done.

I believe that of all the cases reported: the case of Dr. Price, the case reported by me to-day of Dr. Hawley, and the second

case of Dr. Hawley which I had not heard of until Dr. Coe mentioned it to-day, are the only cases of "primary operation" for tubal pregnancy. In all other cases there has been evidence of some shock. I think, in all those cases, as I stated two years ago, and as Dr. Johnstone has stated to-day, that there has always been in each case, when any shock occurred, a slight hemorrhage, and that the tearing of the nerve filaments in the peritoneal surface is the cause of the shock. The case which Dr. Johnstone reported, which he operated upon, and which was the first case in this country of secondary operation, shows very conclusively the different strata of hemorrhagic layers, which had occurred at successive times. Now, I have recommended this operation of primary laparotomy, if any laceration or tearing has occurred, as soon as the diagnosis has been established. I have recommended it only to men who are accustomed to deal with abdominal surgery, and who are, therefore, competent to operate in these cases. I would not recommend it to any one who has not performed quite a good many operations in abdominal surgery. To all such, I would say, use electricity by all means, as being the safest thing for the patient and the best thing for the physician and surgeon too, who has not the training and experience in abdominal surgery.

I would like to ask Dr. Harvey what it was that Mr. Tait extracted; if he saw just what it was. I must confess that, after reading Mr. Tait's report of his five or six cases very carefully (although he has reported every case as a case of extra-uterine pregnancy), in many of the cases the report is very meagre; and the description does not state that a fœtus was found, or that the membranes or placenta were found. I do not wish to do him any injustice, but such are the facts of his own reports. I would, therefore, like to ask Dr. Harvey, as he did not state what Mr. Tait removed, if he knows what it was that was removed.

As regards the pulsations of the tumor, which Dr. Reeve spoke of, I forgot to insert it in my paper, but that symptom I gave in a paper presented to this Society two years ago, as one of the principal factors in the diagnosis.

As to the question of ulceration after the death of the fœtus by electricity. In the paper read last April before the New York Medical Association, I quoted from Dr. Mann's paper,

published in the *Annals of Gynecology* for February, 1888, and in that paper Dr. Mann, who is very urgent in his demands for electricity in these cases, speaks of two cases in which, after the fetus had been killed, it had ulcerated its way out.

In reference to Dr. Johnstone's case. It fully proves the ground which I took two years ago, that when these sharply defined pains occur, it shows a shock, and we will find blood-clots corresponding in age to each one of these shocks.

I fully agree with Dr. Engelmann, in the practice of using electricity.

In regard to the question raised by Dr. Dudley, as to diagnosis, I do not know of any other symptoms which I can add to those mentioned in my paper. I think that the symptoms as given, the presence of the decidual membrane, part if not the whole, with all the usual symptoms of pregnancy, and all the symptoms given there—the physical examination, the pulsation of the tumor, the exquisite sensitiveness of it—ought certainly to arrest the attention of any practitioner, and, if the case is brought to the notice of a gynecologist, it certainly ought to arrest his attention sufficiently to show that it is one of two things: either a tubal pregnancy in its early stages, or some other mass in the tube or the ovary. In either circumstance, to a man accustomed to such work, I think, with our present means and our present success in adominal surgery, an exploratory incision is justifiable. Whether we find a tubal pregnancy, or whether we find a cyst of the broad ligament, or a simple cyst of the ovary, a hydrosalpinx, or a pyosalpinx—it ought to be dealt with surgically, and the exploratory incision is the best possible means to meet all the indications.

Dr. Harvey.—In reference to the specimen, I may say that Dr. Parvin, of Philadelphia, saw the operation also, but we were going on to another operation immediately afterward, so we did not inspect the specimen very carefully; but we saw the fimbriated extremity, loose at one end of the tumor. No fetus was found, but a large quantity of fresh clots was washed out of the cavity.

Dr. Janvrin.—If the fetus, membranes, or placenta were not found, judging from what Dr. Harvey has told us, I should say it was nothing more than a hæmatocele.

Dr. Hanks.—The points which I made have not been controverted at all. I do not wish to exclude the laparotomists, it is their privilege; but I do wish to have a law go out for general practitioners, so they may not be under the necessity of waiting, as did this patient in Calcutta, for the doctor to reach them. I wish to have the general practitioner prepared to use electricity pending the arrival of the laparotomist, and I believe if these rules are carried out, which I have stated in the closing remarks of my paper, that we shall have very many less deaths from tubal pregnancy during the next ten years than in the past ten years.

The question which Dr. Johnstone has considered so carefully, I wish to rebut. As I have stated in my paper, and as probably every member of this Society knows, there have never been any cases reported of serious after-trouble, when life from the dead fœtus was destroyed before the third month. Dr. Chadwick's case, which was reported here in the discussion of Dr. Van de Warker's case, two years ago, was a case in which the fœtus was killed between the fourth and fifth month, and, of course, there was trouble; that was the time to do a laparotomy. The time to use electricity is before the fourth month, and, if possible, before the third month, and if the fœtus dies before the arrival of the laparotomist, it is well. We can always destroy the fœtus by electricity; and there has never been a death directly from electricity when the fœtus did not pass the third month. Dr. Janvrin's patient did not die *from* using electricity, but rather in spite of it. He acknowledges in his case that there was a rupture of a large vessel before; he says the patient lay for two hours before reaction took place. I do not think there is anything to do in these cases but a laparotomy. I have a lady from Texas, who is in New York now, who had a tubal pregnancy that died after rupture of tube. She is suffering from other troubles at the present time, and I found just a little nipple to be felt around the left tube. That is all that is left of the tubal pregnancy, in which the fœtus died between the third and fourth month. We can trust to electricity to destroy the fœtus before the third month, and all but the laparotomist should use it.

In my paper I do not claim that it is necessary to use electricity on all occasions, in tubal pregnancies, but I believe it to

be the best method of treatment in the vast majority of cases that have not passed the third month. A good laparotomist may resort to abdominal section for the removal of the unruptured, impregnated tube, and expect a happy result. The general practitioner, however, who is not *au fait* in this department of surgery, cannot be so sure. In fact, he will undoubtedly lose two cases in every three.

Up to three and a half months the fœtus, killed by electricity, has never occasioned trouble, Dr. Johnstone's remarks in reference to its being an abdominal dynamite to the contrary, notwithstanding. The case recited by Dr. Dudley was one in which electricity was not only justifiable, but was demanded. Dr. Gordon's remarks simply prove what I claimed in my paper, that the skilled laparotomist can, and ought to, remove the fœtus and save the mother at any period.

Mr. Tait has had eight successful operations in succession. He would undoubtedly have been equally successful in destroying the fœtus, and curing the patient, had he used electricity before rupture. The general practitioner would undoubtedly have lost half of Mr. Tait's cases with the former method, and cured all by the latter method.

CYSTOCOLPOCELE COMPLICATING PREGNANCY AND LABOR.

A Supplemental Contribution.

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This paper is supplemental to the paper entitled "Cystocolpocele Complicating Pregnancy and Labor," presented to this Society at its last meeting, and published in vol. xii., pages 83–127, of the Society's *Transactions*. It supplies abstracts of the cases unavoidably omitted from that paper, and concludes with a tabulated summary of all cases classified as complications of pregnancy and labor.

It is believed that this collection and analysis of reported cases is sufficiently complete to present the subject fully and satisfactorily, so that, in the future, the management of these complications, fortunately of rare occurrence, will not be embarrassed by faulty and mistaken diagnoses; and the pregnant and parturient women, who may be thus sorely afflicted, will not be subjected to the long-continued and intense suffering which these clinical reports present.

Case XXXVII.[1]—"Mrs. N. N., in her second pregnancy, had suffered nothing during the first month; but during the seventh month, having had to walk a good deal and exert herself in some other ways, she began to feel sometimes as if she had in the upper and anterior part of the vagina a kind of tumor, to which she did not pay much attention, because it came and went; and for

[1] Ponte: Gaceta Cientifica Carácas, Marzo 15de 1881.

this reason she did not consult any one. But some time afterward she began to notice that the tumor did not disappear, even after passing water, and that the urine had become turbid and offensive. Besides this, the tumor was painful whenever she tried to pass water; and these pains had increased considerably during the last days, in which the tumor had become very large and came out of the vulva, and could not be reduced in size, for which reason she had believed that it was the matrix.

"Upon this statement of facts I proceeded to make an examination, and found that she was in the eighth month of her pregnancy; that there was a tumor coming out of the vulva of the size of the head of a fœtus six months old; soft, fluctuating, pyriform, smooth, and of a dark red color. Every effort made by the patient increased its volume, especially when she was in a standing position, and it was not completely reducible. The tissue of the vagina which surrounded it was thick and hard, and the finger could not penetrate between the tumor and the symphysis, but could be placed between it and the posterior wall of the vagina, and slid downward until touching the neck, which appeared to the touch as if it were high and turned backward.

"I then made an attempt to introduce a catheter, and as I could not do so with the ordinary ones used for women, I had to use a long one of those used for men, and to place it in such a way as to cause its curve to be backward and down. And as soon as this was done a large quantity of turbid and ammoniacal urine was discharged and the tumor disappeared.

"I directed the patient to wash the parts in cold water with perchloride of iron; recommended rest and the frequent use of the catheter, and called her attention especially to the necessity which she had of remembering this affection in the moment of the labor, in order to avoid the consequences it might then produce.

"When called a month later she had been in labor two days, and attended only by an uninstructed woman, who believed that the large tumor was the matrix, and who imagined that through the great efforts she caused the patient to make, she would be able to get her out of that deplorable condition.

"The bottom of the bladder had descended under the head

the tumor had become exceedingly voluminous on account of the pressure which the head of the child, pushed by violent uterine contractions, exerted against all the tissues, which forced it downward; and the result was a state of contusion of all the parts, which rendered gangrene imminent. Every attempt at reduction was then impossible on account of the advanced position of the head. But by employing the catheter, in the way above explained, and following the same process as before, and taking advantage of the little intervals between the pains, I succeeded, although with great difficulty, in introducing it. But although I extracted in this way a large quantity of liquid, the infiltration of the tissues was so great that the volume of the tumor scarcely diminished; on the contrary, the distention and the tumefaction to which the tissues, obstructed by the passage of the head, were subjected, increased in proportion with the violent efforts of the patient. The latter had acute pains in the whole of that region, the color of which had become dark violet, almost black.

"Under such circumstances I considered that the most urgent thing to be done was to hasten the labor, which had been delayed in that condition for two days. I thought that this was the only means of remedying that obstruction in the circulation. And the only way to satisfy this indication was to use the forceps. All the requisite conditions having been absolutely complied with, I proceeded without delay to apply the instrument, and I succeeded almost immediately in extracting a child, alive and healthy, without causing any suffering to the mother and without injuring in the least, either her or the child. By this action that situation, both dangerous and abnormal, ceased to exist. The mother and child did well."

Ponte states that two other cases had occurred in his own practice, but omits their clinical histories.

Case XXXVIII.[1]—The patient had been four times confined, three times of twins, being one of twins herself. On two of these occasions forceps had been used on account, it was said, of tumors

[1] Cystocele complicating pregnancy. Induction of premature labor: operation. Recovery. H. E. Spencer. British Medical Journal, 1882, vol. xi. p. 1246.

obstructing the passage. The patient appeared to be at the point of delivery. Violent expulsive pains came on incessantly, the woman bearing down with all her might, and pulling vigorously at a towel attached to the bed-post. Pains similar in character, but less in degree, had, however, occurred often within the previous four weeks. These violent efforts to expel the supposed fœtus had been going on for several hours. On examination a globular mass about the size of a fœtal head was found protruding from the vagina, which proved to be the anterior wall of the vagina, from the congested surface of which blood was oozing. The uterus showed no signs of labor having commenced. A catheter was passed, but only a little urine escaped, and no relief was given. Pressure above the pubis did not produce any sensation referable to the bladder. The fœtal heart was plainly heard.

During the next three days things went on, expulsive pains recurring every few minutes. Catheterization and the liberal use of opiates gave scarcely any relief. Objects introduced into the vagina with a view to action, as pessaries, were immediately expelled. As it appeared that the trouble incident to the vaginal prolapse had greatly increased coincidently with the progress of pregnancy, premature labor was induced by inserting a catheter between the membrane and uterine wall, pushed up several inches and left. In twenty-four hours the os was sufficiently dilated to permit the introduction of the hand; chloroform was administered, and a living female infant, of about six months development, was extracted by turning. The child lived fourteen hours.

For two weeks the convalescence was satisfactory, but as soon as she resumed her household duties the prolapse recurred with as great distress as ever, with dysuria. As soon as her health permitted an operation was done, consisting in the removal of an ellipsoidal piece of mucous membrane two inches long and one inch broad from the anterior vaginal wall. Two months after the performance of this operation the patient was entirely well and free from any discomfort whatever; in fact, was better than she had been since her first confinement.

Case XXXIX.—Prolapse of the vagina and bladder.[1] A

[1] T. C. Shepard. Nashville Journ. Med. and Surg., 1880, vol. lxxvi. p. 152.

colored woman, aged forty, the mother of fourteen children, was supposed to be in labor when the doctor arrived. He found a tumor the size of a child's head projecting from the vagina, and dangling between the woman's thighs. It was evident that the sac contained a liquid, but a careful examination revealed the fact that it was a prolapsus of the vagina and bladder.

The woman assured the doctor that she had been in this condition for six or eight weeks, and during all this time she had passed water without difficulty. The bladder was evacuated with a catheter, and the parts returned with difficulty. They remained in position until labor began, twenty-four hours afterward, when it became necessary to hold them in position until the head had fairly engaged.

Case XL.[1]—Labor pains had occurred regularly for six hours previous to his first visit. A vaginal examination detected a fluctuating tumor about the size of a fœtal head, depending direct from the superior vaginal wall; the tip of the finger could detect the patulous os, but could not reach the presenting part of the child. The tumor was not painful, nor had there been marked desire to urinate. Patient had passed water several times during the day. After voluntary evacuation of the bladder, the obstruction disappeared, with the exception of the shrunken walls, which lay in rugæ on the upper surface of the vagina. No other trouble was experienced, and, in about two hours, she was delivered of twins. This was her fourth confinement.

In my first paper I referred to a collection of cases by Puchelt, published at Heidelberg, in 1840. The volume containing this paper could not be obtained in this country at that time, but since, through the kindness of Dr. Billings, it has been secured, and is now deposited in the library of the Surgeon-General's Office.

The paper of Puchelt, entitled, "Hernia Vesicæ Urinariæ Vaginalis et Perinæalis,"[2] contains abstracts of eight cases

[1] Sannier. Journ. Amer. Med. Assoc, vol. ix. p. 575.

[2] Commentatio de Tumoribus in pelvi, Partum Impedientibus. A Gratioso Medicorum ordine Heidelbergensi Præmio Oranto. Auctore Bernone Rudolph, Puchelt, p. 231, MDCCCXL.

of vesical vaginal herniæ, and two cases of perineal vesical herniæ. Of the eight cases of vesical vaginal herniæ the cases of Lachapelle and Merriman have been referred to; the other cases are supplied in abstract as follows:

Case LXI.[1]—"The patient, when first seen, had been in labor many hours; but the descent of the fœtal head was resisted by a large elastic tumor which, more especially, occupied the front and lateral portions of the pelvis. The child's head and the dilated orifice of the uterus were ascertained to bear no other relation to the tumor than that of superincumbency upon its upper part. The first measure to have been adopted for the proper relief of such a case was obviously the introduction of the catheter to empty the bladder. It contained about a pound and a half of urine. Upon removal of the catheter, the tumor was felt very loose and flaccid, but still considerably pendulous. The patient was, however, in less than an hour afterward, delivered of a living child."

Davis[2] refers to another case, which he describes as a soft, elastic tumor, about the size of a small orange, situated "immediately within the os externum, anteriorly and rather to the left." It was not diminished by the evacuation of the bladder, and did not "oppose any material obstacle to delivery." It was not a cystocolpocele, but a cystic tumor springing from the internal surface of the os externum.

Case LXII.[3]—Robert found in a parturient woman a tumor at the vaginal entrance, sac-like in form, and giving the sensation of containing fluid. The tumor occupied the anterior part of the vagina in the region of the symphysis pubis, and the woman was troubled with frequent and painful micturition. After the woman was placed in a better position, Robert found the tumor to equal in size the head of a child recently born, and he diagnosticated it to be a part of the bladder distended with urine. By the aid of the catheter and compression of the tumor

[1] David D. Davis: Elements of Operative Midwifery, 1825, p. 129.

[2] Loc. cit., p. 128. Case XXI., p. 109, Gynæcol. Trans., vol. xi., is a third case reported by Davis.

[3] Robert: Cf. Mem. de Chir., ed. 12, tom. iv. p. 58, Paris, 1753.

[4] Case I. of Puchelt's collection.

the vesical hernia was emptied and the labor terminated satisfactorily.

Case XLIII.[1]—"The subject of this case was Madame C. The protrusion was at first mistaken for the bag of membranes; but upon passing a finger carefully around it, it was discovered that the tumor took its origin from the superior and right side of the vagina, and that it consisted of a part of the bladder, which the contractions of the abdominal muscles had forced into that situation, so as to produce great distention, but no rupture of the wall of the vagina. A catheter was passed into the bladder and the urine withdrawn. The tumor was then for the moment reduced. The delivery took place as soon as could have been expected; but the patient was ever after subject to the protrusion. By similar precautions during a subsequent labor she was equally happily delivered. She continued, however, subject to the disagreeable necessity of wearing a sponge pessary."

Puchelt supplies the following abstracts of three cases observed by Brand, which I cannot verify:

Case XLIV.—"Sandifort gives three cases observed by Brand. In a parturient woman to whom Brand was called a few hours before her death, he saw under the arch of the pubic bones and the superior part of the labial commissure a black tumor which the midwife took to be the head of the fœtus covered by membranes. Properly explored, it turned out to be a turgid bladder pushed forward and without, whence, by a flexible catheter, he drew off a large quantity of bloody urine. Examining further, he found the uterus ruptured in the posterior part."

Case XLV.—"Brand's second case is as follows: The patient was a woman in the last month of pregnancy. The tumor filled the whole vagina, lying contiguous to the anterior lip of the os uteri. After the expulsion of a great quantity of urine it diminished in size, but filled again with retained urine. After the fœtus had been delivered by artificial means, the bladder, which had not expelled any urine since the delivery, descended into

[1] Aussandon: Corvisant's Journ. de Méd., vol. xxv. p. 398. Also Operative Midwifery, Davis, p. 129.

the vagina, and, being again evacuated, was well retained in place by a pessary made of lint."

Case XLVI.—"The third case of Brand, narrated by Sandifort, is as follows: It was observed in the body of a woman who had died in childbirth, who could not be delivered by Cæsarean section on account of the husband's refusal, nor by instruments, on account of the remarkable narrowing of the pelvis, in great part by a tumor hanging between the vagina and rectum. In this body a large tumor, black, compressible, slipping under the pubic arch, was beheld; and when this tumor was compressed urine passed from the urinary meatus."

I add the following two cases of perineal vesical hernia to which Puchelt refers. These cases and Case XLVI., in which the bladder was forced down between the vagina and rectum, seem to be nothing more than exaggerated forms of varieties of cystocolpocele previously described. In the cases of Mery and Curade the bladder was so displaced into the vagina as to distend the perineum, and in Bland's case a lateral displacement, not unlike that observed by Christian, was extended downward into the pelvis. It may be that the three cases were alike, only differing in degree. If it is possible that the bladder could be forced down between the rectum and posterior vaginal wall, it is not improbable that it might extend toward, and distend the perineum, making a hernial tumor in the perineum.

Case XLVII.—The first is that of M. Mery.[1] He says that having been consulted by a poor woman, between five and six months pregnant, who complained of not being able to urinate without much pain, he discovered between the vulva and the anus, a little to the side, a tumor larger than a hen's egg; and that in touching lightly this tumor there escaped some drops of urine from the urethra; he judged that it was formed by a portion of the bladder, and that the compression of the uterus prevented the emptying of the bladder, despite the efforts of the woman to urinate. It was that which rendered the voidance of

[1] Mem. de l'Acad. Royale des Sciences, 1715.

the urine more difficult and very painful. M. Mery had no longer any doubt of its being a hernia of the bladder, when after compression of the tumor he saw it entirely disappear, and all urine which it contained having been evacuated through the ordinary channel.

Case XLVIII.—The second observation is that of M. Curade, Senior.[1] He relates that having been called to see a lady about twenty-three years old, and six months pregnant, he found a tumor in the perineum, a little to the side, which increased in size whenever the woman was standing and had not passed water for a long time. This tumor, says M. Curade, seemed to be covered only by the skin, which retained its normal color. It was soft, not painful, and fluctuation was apparent to the touch; the least pressure caused its disappearance, but it reappeared immediately when the pressure ceased. If the pressure was slight, it simply excited a desire to urinate; but if the pressure was stronger, it caused some drops of urine to escape from the urethra. These circumstances led that able surgeon to believe that this tumor was formed by a portion of the bladder, which finding itself compressed by the uterus had slipped to the side of the vagina and rectum.

This hernia disappeared after the labor and did not return until toward the end of the second pregnancy. M. Curade, after having emptied by pressure the bladder which formed the tumor, kept it in position by compresses and a suitable bandage. He says the second hernia was considerably larger than the first, and that it occupied the whole perineum.

Puchelt insisted that if the bladder is imprisoned by the gravid uterus and its expansion above the pubes is prevented, it will be pushed into the pelvis and project where the resistance is least. A lateral displacement may, by continuous distention and expansion of the bladder, be so extended and increased as to present a tumor between the rectum and posterior vaginal wall, which may, finally, rest against and distend the perineum.

The following statements comprise the cases reproduced in this and the previous paper:

[1] Surgeon of Avignon.

TABLE I.—TABULATED SUMMARY OF CASES OF CYSTOCOLPOCELE COMPLICATING PREGNANCY.

No. of case.	Age	No. of pregnancy.	Period of pregnancy.	Duration of pregnancy.	Labor.	Result to mother and child.	Remarks.
I.	24	2	End of eighth month.	Full term.	Natural.	Mother recovered; child not stated.	
II.	28	4	Latter months.	.....	Premature.	Mother recovered; child dead; weighed 4 lbs.	Suffered in similar manner during third pregnancy.
III.	...	...	.....	.....	.....	.....	Details not given.
IV.	...	7	Eighth month.	Eight months.	Premature.	Mother recovered.	Incontinence of urine previously.
V.	...	...	.....	Full term.	Tedious.	.....	Had suffered for several months with dysuria.
VI.	...	...	.....	Near full term.	Natural.	Mother recovered.	
XXXVII.	...	2	Eighth month.	Full term.	Forceps	Mother recovered; child alive.	
XXXVIII.	...	4	Sixth month.	Six months.	Premature labor induced.	Mother recovered; child dead.	
XXXIX.	40	15	Eighth month.	Full term.	Natural.	Not stated.	
XLV.	...	...	.....	Nine months.	Artificial.	Not stated.	Bladder retained in position by lint pessary.
XLVII.	...	...	Sixth month.				
XLVIII.	23	1	Sixth month	.....	.....	....	Returned during second pregnancy.

TABLE II—CYSTOCOLPOCELE COMPLICATING LABOR.

No. of case.	Age.	Number of pregnancy.	Duration of pregnancy.	Labor: character and duration.	Result to mother.	Result to child.	Remarks.
VII.	...	...	Full term.	24 hours; estimated.	Recovered.	Alive.	
VIII.	32	8	" "	Very protracted.	"	"	
IX.	21	2	" "	Natural	"	"	Prolapse had existed for two years.
X.	30	4	" "	Forceps; 24 hours.	"	"	
XI.	22	3	" "	Forceps.	"	"	Tumor observed during pregnancy.
XII.	...	7	" "	Chloroform; 24 hours.	"	"	Adherent placenta.
XIII.	...	2	" "	Natural.	"	"	
XIV.	...	...	" "	Chloroform.	Not stated.	.....	Partial prolapse.
XV.	...	3	" "	Turned; protracted.	" "		
XVI.	...	3	" "	Artificial dilatation.	Recovered.	Alive.	
XVII.	...	...	Not stated.	3 days and 2 nights.	"	Dead.	Craniotomy; bladder punctured.
XVIII.	...	3	" "	72 hours.	"	Not stated.	Bladder tapped.
XIX.	...	10	" "	12 hours.	"	" "	Incontinence for one month.
XX.	..	...	" "	Natural.	"	" "	
XXI.	40	16	" "	48 hours.	Not stated.	" "	Twins.
XXII.	40	6	" "	12 hours.	" "	" "	
XXIII.	29	3	" "	24 hours.	" "	" "	
XXIV.	46	12	" "	.....	" "	" "	Bladder prolapsed since eighth pregnancy.
XXV.	30	3	" "	3 days; turning.	" "	" "	
XXVI.	...	...	" "	Natural.	" "	" "	
XXVII.	...	4	" "	3 days; crotchet.	" "	Dead.	
XXVIII.	...	...	" "	Tedious.	" "	Not stated.	
XXIX.	35	9	" "	29 hours.	Recovered.	Alive.	Procidentia uteri.
XXX.	30	6	" "	Forceps; 3 days.	Not stated.	Not stated.	
XXXIV.	...	11	" "	30 hours; turned.	" "	Dead.	Craniotomy.
XXXV.	...	2	" "	Tedious.			
XXXVI.	45	10	.....	Protracted.	Not stated.		
XL.	...	4	.....	Natural.			
XLI.	...	...	.....	.....	.....	Alive.	

ON THE USE OF CHLORATE OF POTASSA IN OBSTETRICS AND GYNECOLOGY.

By Alexander Russell Simpson, M.D., F.R.S.E.,
Professor of Midwifery and the Diseases of Women and Children in the University of Edinburgh.

In a clinical lecture published in 1845,[1] Sir James Simpson stated that, "in a great number of cases, and apparently with perfect success," he had kept patients constantly on small doses of alkaline salts, such as chlorate of potassa, in cases where they had lost the children of previous pregnancies from disease of the placenta. He was led to the employment of these alkaline salts from consideration of the statements of Dr. Stevens,[2] who had published some striking results from their use in cases of fever and cholera, which seemed to prove that they had an oxygenating or arterializing influence on the blood of such patients. It had been shown that if the salines were freely administered to patients whose blood had become darkly venous, the administration was followed by a distinct change till it became more brightly arterial. "If," said Sir James, "you cover a coagulum of newly drawn venous blood with a thin layer of water, the surface of the blood continues to retain its dark color. If you add alkaline salts to the intervening layer of water, the air will very speedily act through this medium so as to render the clot of a red arterial color." In cases of placental inefficiency, he argued, let us render the

[1] In the London and Edinburgh Monthly Journal of the Medical Sciences, vol. v. p. 119. See his Selected Obstetrical Works, edited by Dr. Watt Black, p. 142, 1871.

[2] On the Blood, 1832.

blood more arterial, and the interchange of gases in the feeble placenta will be facilitated. And, under the idea that the salt parted with its oxygen in the blood, he made use of chlorate of potassa in preference to other alkaline salts, because out of every eight atoms of the chlorate as many as six atoms consist of oxygen.

Already, as a student, I had the opportunity of seeing the value of the administration of the drug in the cases of two patients, in one of whom a child was carried to full term alive, although the placenta was apoplectic, and she had lost children in previous pregnancies for the same placental disease; while in the other the result had simply been to prolong the life of the child till near the full term in a patient who had lost a series, sometimes at the seventh, sometimes at the sixth month.

When, in the winter of 1857, I worked in Virchow's Pathological Institute at Berlin, I took the opportunity of making some investigations as to the influence of chlorate of potassa in his chemical laboratory, under the guidance of Dr. Hoppe-Seyler. I had only gone far enough to find that the salt was excreted in large quantity undecomposed in the urine, when Dr. Hoppe-Seyler put into my hands the work of M. E. Isambert.[1] This is the most important memoir that has appeared on the subject. The author shows that within a short time after the chlorate has been administered by the mouth, it can be discovered in almost all the secretions of the body, and these observations have been amply confirmed. Thus it has been detected in the saliva, in the tears, in the sweat, in the milk; and Tacke, a pupil of Binz, found it in the bronchial secretion of a dog, by passing a feather through a tracheotomy wound half an hour after its administration. But the great channel for the elimination of the drug is the

[1] Études chimiques, physiologiques et cliniques sur l'emploi thérapeutique du chlorate de potasse, specialement dans les affections diphtheritiques, Paris, 1856. See also his article "Chlorates," in Dictionnaire Encyclopédiques Sciences Médicales, xvi. p 549, 1874.

renal secretion. I was able to confirm Isambert's observation that a careful quantitative analysis of the urine passed within thirty hours after the administration of a dose of chlorate, yields such a proportion as practically represents the whole of the drug. M. Rabuteau,[1] who began his researches expecting to find some degree of decomposition, has made a series of experiments which led him to the conclusion that the whole of the chlorate of potassa introduced into the stomach passes off unchanged through the kidneys. Even if there was a partial decomposition of the salt in the system, it is clear that its efficacy cannot depend merely on the amount of oxygen that it could possibly yield in the doses that are found sufficient to insure its activity.

Binz[2] has made to these observations the very proper objection that they refer only to chlorate of potassa administered to individuals in perfect health. He has himself found that when pus or fibrin is present in a solution of the salt kept at the temperature of a room or at blood-heat it becomes reduced, and the reduction of the chlorate becomes more rapid when decomposition sets in in the organic matter introduced into the solution; and he suggests that in some diseased conditions of the system oxygen may be withdrawn from chlorate of potassa then administered.

Hugo Schulz[3] finds that chlorine salts become decomposed under the action of free carbonic acid. Whitla[4] also says, "Mering, in Hoppe-Seyler's laboratory, has demonstrated that this salt under the influence of carbonic and probably other acids, is decomposed in the system with the gradual liberation of chloric acid, which tends to reduce the alkalinity of

[1] Études sur le Chlorate de Potassium et divers autres Chlorates. Gazette Hebdomadaire de Médecine et de la Chirurgie, v. 705, 1868; and Comtes rendus et Mémoires de la Société de Biologie, 1874, Mémoires p. 95.

[2] Ueber Reduction des Chlorsauren Kalis Archiv für Experimentelle Pathologie, x. 153, 1879.

[3] Die Zerlegung der Chloride durch Kohlensäure. Pflüger's Archiv, xxvii. 454, 1882.

[4] Pharmacy, Materia Medica, and Therapeutics, 3d ed., p. 455.

the blood; and in this," adds Whitla, "lies the key to the right understanding of the action of chlorate of potassium." Whether we adopt this last suggestion or not, it is important to note that under special circumstances some reduction of chlorate of potassa may take place in the system, and to keep in view further the important observations of Marchand[1] as to the changes produced in the blood of persons that have been poisoned by overdoses of the drug. It results especially from his observations and experiments that the hæmoglobin of the corpuscles becomes transformed into metahæmoglobin. The exact nature of this substance, and its relations to oxy-hæmoglobin, are still imperfectly understood. But Gamgee[2] tells us on the authority of Hoppe-Seyler, that "metahæmoglobin contains more oxygen than hæmoglobin, but less than oxy-hæmoglobin, and this oxygen is in a more stable condition than in the latter body." So it does not seem far-fetched to suppose that, without itself undergoing great reduction, chlorate of potassa may so modify the hæmoglobin in the placental sinuses as to facilitate the transfer of its oxygen to the absorbent elements in the fœtal villi. Porak[3] concluded from a series of experiments that chlorate of potassa passed more rapidly from the maternal to the fœtal system than other salts, and that this facility of transmission might serve to explain its value in cases of tendency to habitual death of the fœtus. Fehling,[4] however, throws doubt on the correctness of Porak's conclusions.

Apart from the question as to whether chlorate of potassa becomes decomposed to any degree in the system, Isambert indicates that it augments appetite, provokes salivation, increases the flow of bile, and in large doses is a diuretic, and

[1] Ueber die Intoxication durch Chlorsaure Salze; in Virchow's Archiv, lxxvii. 455, 1879.

[2] Physiological Chemistry of the Animal Body, i. 112, 1880.

[3] De l'absorption des Médicaments par le Placenta et de leur elimination par l'urine des nouveau-nes. 1878.

[4] Zum Verhalten des Chlorsauren Kali bei seinem Durchtritte durch die Placenta, Archiv für Gynäkologie, xvi. 286, 1880.

sedative to the action of the heart. This last property is also vindicated for the salt by Socquet,[1] who attributes the beneficial influences which he had found from its employment in acute articular rheumatism to its sedative effect on the circulation; and Rabuteau advocates for it an antiphlogistic action in consequence of its slowing of the pulse, along with other influences. Bartholow[2] observes, that "the alterations produced in the composition of the blood by the salts of potash necessarily affect the nutritive functions. The increased elimination," he says, "of urea, the waste of the fatty constituents of the blood and of the tissues, the more rapid process of oxidation, results of the action of the salts of potash, necessarily place these remedies among the list of those promoting destructive metamorphosis."

Whatever be its modus operandi, it is important to note that there has been abundant testimony as to the efficacy of the drug in promoting the vitality of infants liable to die in utero from placental disease. One of the earliest contributions to the subject was made by Dr. Grimsdale,[3] of Liverpool, who gives the history of five cases in full, and refers to ten others in which it gave good results, although in two he had not been able to trace any benefit from its employment. Besides that, Professor Barton Cooke Hirst[4] tells us it has been recommended among others by Carl Braun, Fordyce Barker, and Penrose, and that its employment has been endorsed by Thorburn,[5] Barnes,[6] and others; we find that from time to time the question has been brought up in the Edinburgh Obstetrical Society, and always with the result that some of the most experienced accoucheurs in this city could tell of the success which, in their hands,

[1] Gazette Hebdomadaire, Oct. 1854, p. 297.

[2] Materia Medica, 1884, p. 191.

[3] Memoranda on the Use of Chlorate of Potassa in Pregnancy. Liverpool Medico-Chirurgical Journal, i. 248, 1858.

[4] A System of Obstetrics by American Authors, i. 294, 1888.

[5] Suggestions as to the Medicinal Treatment of the Unborn Child. Liverpool and Manchester Medical and Surgical Reports, iii. 1, 1875.

[6] Obstetric Medicine and Surgery, i. 548, 1884.

had followed from the use of chlorate of potassa. Thus, in 1865, when Dr. Bruce[1] related some cases in which he had seen good results from its employment, Dr. Inglis said he had never seen it fail, and narrated a case of a patient who had given birth to sixteen stillborn children, but who brought forth her seventeenth alive, because in that pregnancy she had been put on chlorate of potassa. Dr. Sidey thought that it was always useful. Drs. Cairns, Moir, Keiller, and Bryce, referred to cases in their own practice in which it had done good; and Dr. Thomas Balfour made the suggestion, that as sea water contains more oxygen than fresh, so blood containing potassic chlorate might be able to hold more oxygen without the salt becoming itself decomposed. In 1869,[2] when Dr. Cuthbert related a case illustrating its value, Dr. Bruce admitted that it had always proved successful. Still, some of the Fellows who had spoken previously to its efficacy expressed their continued confidence in it, and Dr. Menzies and Dr. Murray added their testimony to its beneficial effects in cases that had been under their care. At that meeting, just a year before his death, Sir James Simpson admitted that it sometimes failed, as all remedies fail at times. But though he no longer thought that its good effects were attributable to the amount of oxygen which the salt contained, he still believed in its efficacy, stating that he had seen it succeed in many cases in which rest had not been combined with it, and mentioning the case of a lady who had a long succession of abortions, took the chlorate, and had two living children afterward.

If we inquire into the kind of cases that seem to benefit from the use of the drug, I think we shall find that they are of two kinds. These are, *first*, women who have lost a series of children from syphilis; and *second*, those whose infants

[1] Proceedings of the Edinburgh Obstetrical Society, Nov. 15, 1865, in Edinburg Medical Journal, Jan. 1866, p. 669.

[2] Proceedings of Edinburgh Obstetrical Society May 12, 1869, in Edinburgh Medical Journal, July, 1869, p. 85; and Transactions of the Edinburgh Obstetrical Society, i. 112, 1870.

have died with placental apoplexies, usually associated with albuminuria.

As to the syphilitic cases, of course it is just in them that we require to be careful in attributing to the administration of any drug an improvement in the conditions of pregnancy that may be merely the natural result of the lapse of time. It is well established that women who have lost a series of children from syphilis may eventually carry to term a living child; this is especially the case in healthy wives who have been impregnated by syphilitic husbands. In them, if they themselves escape the taint, each succeeding ovum has a better and better chance of survival, because in the course of time the poison with which each has been infected, is becoming less and less intense. On the other hand, there is the risk of the virus passing into her system, so that she herself becomes the seat of danger; and if the marital virus is not diminishing, each succeeding ovum becomes more liable to perish, and the woman gets a series of earlier and more hopeless abortions. In the latter group of cases some more effective antisyphilitic remedy than potassic chlorate is required; and if we administer it in the former we must be careful not to attribute to it the survival of an infant which has simply escaped from a less intense empoisonment than its predecessors. At the same time, when we recognize the benefits that have been observed from the use of salt in other syphilitic cases in the practice of Jonathan Hutchinson, Gaujot, Tillot, and others cited by M. Isambert in his article to which I have already referred, we can readily believe that in the syphilis of pregnancy also it may exert a beneficial influence. Especially in cases in which the syphilitic placentitis is not widely diffused, but is limited to some of the cotyledons, the administration of the chlorate greatly increases the patient's chances of carrying the child to term. And as we cannot be sure in any pregnancy how the placental mischief may be progressing, I think that every syphilitic gravida who has been passed through a curative

mercurial course should be made afterward to use chlorate of potassa during her pregnancy.

Again in albuminuric patients, as has long been known, and as has been recently illustrated in papers by Fehling[1] and Wiedow[2] and in a thesis by Rouhaud,[3] there is a tendency very distinct, though very difficult of explanation, to the production of blood-extravasations in the placenta. These are usually limited and localized in a few of the cotyledons. The lobules are not simultaneously affected, as it can usually be seen that the blood-clots are in different stages of retrogressive change. Now in several patients who have lost children with such placentæ, I have seen a subsequent child born alive where chlorate of potassa has been used during pregnancy, although its placenta also was partially apoplectic.

However the chlorate may produce its effect, to get good results from its use we must make the patient begin to use it, if we have the opportunity, before the fourth month of pregnancy; and make her continue to take it till the child is born. In some cases it may be desirable to prescribe it in half drachm or drachm doses; but usually it suffices to let twenty grains be taken three times a day. I do not think it material whether it be taken fasting or along with food. It rarely causes any discomfort. In one of Dr. Grimsdale's cases he had to reduce the dose to three and five grains because a larger dose caused headaches. But what is important to remember is, that it does not remain long in the system. Within half an hour or an hour after it is received into the stomach it begins to be freely eliminated by the kidneys, so that in fifteen or twenty hours so much has escaped that only traces of it are found in the urine for ten or fifteen hours longer. Whatever the amount administered, the rate of elimination

[1] Ueber habituelles Absterben der Frucht bei Nierenerkrankung der Mutter. Arch. für Gynäkologie, xxvii. 300.

[2] Ueber den Zusammenhang zwischen Albuminurie und Placentarerkrankung. Zeitschrift für Geburtshülfe und Gynäkologie, xiv. 387, 1888.

[3] Des Lesions du Placenta dans l'Albuminurie. Paris, 1857. Reference in Revue des Sciences Médicales, July, 1888, p. 181.

remains the same. If five grains be administered, it is easily recognized for the following fifteen or twenty hours; if fifty be administered, it has been so completely eliminated during these hours that only a trace is afterward to be recognized. It is of great importance, therefore, so to administer the chlorate that we may be certain that some fair proportion of it is circulating all the time in the patient's blood.

We should see to it, further, that the use is not only uninterrupted but that it be continued until the child is born. A case that occurred in my own practice impressed on my mind the necessity of laying this injunction upon patients ever since. She had been put early in her pregnancy on chlorate of patassa, as much as she could heap on a shilling thrice a day with her meals, and to her great delight had passed the periods at which she had lost several previous children without on this occasion ever missing the fœtal movements. I saw her when she was approaching her full term and heard the fœtal heart. Unfortunately a few days before labor was due her supply of salt ran down. She thought it was not worth while to send for more when she felt so well and her labor was so near at hand. When I was sent for to assist at confinement the heart-sounds were no longer audible: and the child was born dead, though quite fresh and free from post-mortem changes.

In advocating the use of the chlorate of potassa, I do not wish it to be understood that I regard it as a panacea, or that I would urge its employment in the class of cases to which I have referred to the exclusion of other remedial measures. I regard it simply as an invaluable supplement to these. In the syphilitic cases, as I have already hinted, our main reliance will be on the mercurial or other remedies that are found available to clear the system of the venereal virus; while in the renal cases a strict diet and regimen will be required, and besides the chlorate the patient will probably be obliged to take iron and digitalis or strophanthus, and it may be other drugs at times. I might add that in some gynecological cases good results have been reported as following

topical applications of chlorate of potassa. Some of the writers to whom I have referred as advocates of its employment in syphilis have spoken specially of its beneficial action when applied as a dressing to phagedænic sores. To some it has even seemed to exert a healing influence in epitheliomatous ulcers. Thus Burow[1] reports beneficial results from its application in some cases of mammary and other cancers. More strictly within the domain of gynecology, the younger Fabbri[2] records a case in which after amputation of an epithelial cervix uteri some granulation tissue of a cancerous nature that began to sprout up was made to disappear under applications of chlorate of potassa, and Dr. Bedford Brown[3] advocates its employment in cases of leucorrhœa and ulceration of the os uteri.

I have not myself any experience of its value as a local application; but there is a condition which often enough comes under the notice of gynecologists and in which I have seen its administration serviceable. I refer to the cases in which women at the menopause suffer from vague discomforts, flushings, heats, and chills. Where there is no traceable organic lesion I do not know any drug that more constantly gives relief to such patients than chlorate of potassa. It may be given alone for many weeks; or, if there be any tendency to anæmia, it may be given along with tincture of the muriate of iron. Where the patient suffers from indigestion let her take it along with bismuth, rhubarb, and soda.

[1] Aeusserliche Anwendung des Chlorsauren Kali bei offenem carcinom. Berliner klinische Wochenschrift, x. 61, 1873.

[2] Un caso di Cancro epiteliale del collo uterino trattato coll' ampatazione della porzione intravaginale e quindi col clorato di potassa. Bulletino delle Scienze mediche di Bologna. Serie 5 x. 305.

[3] American Journal of the Medical Sciences, xxxiv. 66, 1857.

THE INFERTILITY OF WOMEN. THE NERVOUS SYSTEM IN STERILITY.

Some of the Requirements of Treatment.

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Sterility in the female is an opprobrium acknowledged by the gynecologist; it is also a calamity which is, perhaps, more often and more acutely felt and grievously lamented by the woman herself, than any other relating to her individual life. "Give me children or I die!" comes wailing down the centuries, and which one of us so fortunate as not to have been made conscious that this distressing cry of Rachel, albeit unuttered, is sadly re-echoed in at least one, and perhaps many of the yearning hearts whose desolation we have been powerless to relieve by the most earnest efforts of our art?

In regard to an abnormal functional condition constantly causing such distress, the amount of which cannot be estimated, any considerations, however remotely tending to its correction or relief, cannot be viewed with indifference by the profession.

It is not the object of the present brief paper to consider at large the causes of sterility either natural or acquired. The bare enumeration of them would occupy more space than would be required in the restricted province to which these remarks are necessarily limited.

The essential, if not the initial fact or occurrence upon which procreation depends, in man as well as in all mammalians, and indeed infinitely lower down in the descending

scale, is the contact of germ-cells of the female with the sperm-cells of the male. For the accomplishment of this, and for the development, nutrition, and prosperous growth of the combined result of such a union, all adjustments mechanical, histological, and functional are made—all their physiological intents and purposes tend to the maturing and fulfilling of the contemplated object—the propagation of the race.

The briefest summary of our knowledge concerning the unproductiveness of women would comprise a classification of certain essential conditions of the female organs of generation, which have been found as the frequent concomitants of sterility. One of the first results of such a generalization is the division of these defects into the causes of natural and acquired sterility. While such a classification is necessarily loose and incomprehensive, neither division exclusively appropriating any one of the conditions, as in the one case, the cause of natural, and in the other, of acquired barrenness—for many of these conditions are often present in both classes of cases. For our present purpose, however, no greater exactness is requisite, and therefore in our preliminary remarks I will refer indifferently to the conditions of the organs which constitute most commonly the barriers to reproductiveness in the female.

Some of the Organic Conditions Usually Recognized as Causing Sterility.

Besides the many and various conditions of the organs, either natural or acquired, which obstruct procreation, as defective or absent vulva or uterus; of absent or diseased ovaries or impervious Fallopian tubes; or conditions the result of previous inflammatory states, or inflammatory states still existing, there are certain others to which infertility in the female is more frequently attributed and which come more fully and pertinently within the field to which I have thought best to limit the present discussion. J. Marion Sims,[1] who has given per-

[1] Uterine Surgery.

haps more recent and fuller attention to this subject, and that which to us at present is the most available record of statistics on this matter, has tabulated these conditions, both morbid and teratological in their relations to sterility, and I cannot do better before entering upon the discussion, than to present some of his more striking, though familiar, results.

It may, perhaps, be hoped that any effort to study the nature and origin of obstructing conditions so frequently met, and withal so forlorn, cannot but be regarded with a certain degree of interest by this Society.

As an introduction to the statistical enumeration of the abnormalities recorded by Dr. Sims, I will quote his ideal, though not claiming to be strictly anatomical, of the normal uterus. "We are told by anatomists that the uterus is pear-shaped and flattened antero-posteriorly, that it is from two and a half to three inches long, an inch and a half wide, more or less, at its largest part, and about an inch thick; that it is divided into fundus, body, and cervix; that its cavity is from two and a quarter to two and a half inches long; the canal of the cervix being a little longer than that of the body; that the os tincæ is generally round in the nulliparous uterus, elliptical and transverse after childbearing; and that the cervix is rounded and embraced by the vagina, which is inserted higher behind than before, thus making the posterior intra-vaginal portion of the cervix a little longer than the anterior."

"But," he continues, "anatomists do not tell us how far the intra-vaginal portion of the cervix should project into the vagina, or what proportion it should bear to the supra-vaginal section, which, by the by, is an important matter to determine. He further assumes that a normal os tincæ whether round or transverse and elliptical, should be opened and filled with a slippery translucent mucus of slightly alkaline reaction; that the cervix should be rounded, truncated, and elastic to the touch; that the intra-vaginal portion should be about one-fifth, or not more than a fourth of its whole length—*i.e.*, from a quarter to the third of an inch anteriorly, and a fraction more

posteriorly; that the canal of the cervix should be straight or curved slightly forward; and that the axis of the whole organ should stand at about right angles with that of the vagina, being neither anteverted nor retroverted to any great degree. Any woman with such a state of the uterus will always conceive in three or four months after marriage, *if everything else is right.*"[1]

Defects and Perversions of the Uterine Development.

Of two hundred and eighteen cases of sterility the neck of the uterus was straight, conical and elongated, in one hundred and sixteen, or more than half; it was flexed in seventy-one; of these nineteen were supra-vaginal curvatures complicated with some deviation of the fundus from a normal position. The flexure was associated with a conoid form in fifty-two cases, in some of which there were also malpositions of the body. The cervix was straight, conical, and indurated in four; straight, conical, indurated, and elongated in one hundred and nine; straight, conical, elongated, and not indurated in seven; granular and conical in three cases.

The author's record is one which, while it exhibits the vast preponderance of these *abnormities* and defects of development as offering hindrance to the accomplishment of reproduction, the real intent and purpose of the generative organs, also demonstrates, in a most discouraging way, the extreme paucity of good results following amputation and other surgical measures, heretofore depended principally upon and practised by modern and more remote practitioners; for it appears to us that Dr. Sims, though recognizing more fully than others, these defects of development, as beyond all comparison the cause of sterility, and advocating amputation, incision of the canal, and excision of one or other lip of the uterus, has reported but comparatively few successes in secur-

[1] Italics are mine.—H. F. C.

ing the establishment of the function in cases especially of natural sterility.

Inspired with confidence by the perhaps somewhat questionable reports of Lisfranc, by those of Huguer, of Mackintosh, and of Sir James Y. Simpson, and most of all by the enthusiasm and appealing logic of our own Marion Sims, I had hoped at an earlier stage of my consideration of the question, that to remove the obvious mechanical barriers, as excessive length of cervix, or flexed cervix, or contracted cervical canal, or any other condition apparently competent to obstruct the contact of, or access of, sperm-cells to germ-cells, was to secure conception and to give progeny and happiness to desolate women, but longer experience and many disappointments have forced upon me the unwelcome conviction, and many present will agree with me, that to amputate the elongated or conical neck, or to excise an occluding lip, whether anterior or posterior, or to straighten the flexed cervix, or to correct anterior or posterior deviation, or again to enlarge the constricted canal, whether by bilateral incision or by sponge tents, bougies, or by rapid dilatation with forceps, did not any of them, always—indeed, very rarely—secure the object for which the treatment had often even most confidently been made. What one present, however long his experience, and however distinguished for brilliant success in other departments of gynecology, who will not acknowledge that in such cases of sterility, his experience has been mine, and further, that his disappointments, after the removal of all mechanical barriers have nearly approached to mine, both in their frequency and perplexing inscrutability?

And further, which one of us has not, at least sometimes, after such disappointing results, paused to consider, and been brought seriously to question the proposition that mechanical obstructions in the genital canal, though competent of themselves to prevent conception, may not be, even when they have existed, the only cause which has operated to produce the barrenness, but that some less obvious underlying influ-

ence, or some not sufficiently considered and duly accounted condition—congenital or acquired—which in a large proportion of these pathological or teratological abnormities of the generative organs, have coincidently operated to produce the sterile condition and to continue barrenness, even after the more obvious and more easily recognized mechanical obstructions have been cleared away? May we not suspect that possibly some such occult or unrecognized influence, which now continues the sterility, may have been the original cause of the abnormities themselves?

Of course, in the brief space here allowed, in so obscure and extensive a field, little more can be done than to point out lines of investigation, which are most hopeful and likely to reach results leading, at least, logically to correct conclusions on the subject.

Though in the treatment of sterility by the ordinary and accepted methods, predicated on the ordinary and accepted etiology of the condition, my own results have, perhaps, been as satisfactory as those of most of my fellow-practitioners, it is not to report these successes, or to advocate the advantages of any one modification of such methods over the others that this paper is presented, but rather to enunciate for myself and for others, if you will allow, dissatisfaction with the paucity of good results at present obtained, and to ask that some new direction may be given to the study of the causes of sterility, which may possibly result in some happy modifications of our present methods of treatment.

Having brought the question, perhaps somewhat tediously, to the present point of consideration, and finding that the removal of mechanical barriers, and even the improvement of histological and structural conditions most lamentably fail in yielding the desired results, we may now ask, In what other line of investigation we may yet hope to solve the problem of infertility and to suggest methods for its correction?

The Role of the Nervous System in Atrophic Sterility.

From a long and patient consideration of many of my own cases, and also from a careful study of the reported experience of others, I am led to the following postulates:

First, as it is universally admitted that all the vital processes of the organism whether simple or complex, as sensation and motion, circulation, secretion, nutrition, and trophic development, depend for their due performance on the normal and perfect action of the nervous system, which in each one controls these activities; so likewise must the reproductive organs of the female be dependent upon a proper innervation for their organic perfection, and for the proper performance of their functional activities.

Secondly, that defective or abnormal innervation is the prime cause of the defects of ovarian and uterine development which constitute the most frequent barriers to conception in cases of natural or atrophic sterility.

And thirdly, that the same deficient and abnormal innervation still continuing, perpetuates the sterility and renders normal uterine and ovarian action impossible, even after these obstructive barriers have been mechanically removed.

In the careful examination and study of the above three postulates, we may expect to find that imperfect development and defective activities of the nervous element of the reproductive organs constitute a most important factor in sterility.

Menstruation without Ovaries.

It will hardly be unfamiliar to the Fellows of this Society, to find me discussing nervous instrumentalities and their influential rôle in the economy of the uterine system.

At the Eighth Annual Meeting of this Society in Philadelphia, September, 1883, I read the synopsis of a paper, the title of which was "Menstruation after Extirpation of the

Ovaries." Though no record of this *résumé* is to be found in the proceedings as published in the volume of *Transactions* for that year, a pretty full rehearsal of both my own remarks and of the discussion which followed them, will be found recorded by the reporters of many of the journals of that year, and more particularly in the *Journal of Obstetrics and Diseases of Women and Children*, October, 1883, vol. xvi. page 1038; and also the *New York Medical Record*, vol. xxiv. No. 13, September 29, 1883. The object of this paper, as will be seen by referring to the above records, was to show that though the ovaries may be recognized as the ordinary medium through which menstruation is normally excited, we must still look to the nervous centres of the spinal cord and the ganglionic centres of the hypogastric plexus, and to the ganglia in the structure of the uterus itself, and to nerves distributed to it from the cord and from the plexus, as the real excitors and controllers of the function of menstruation; and further, that menstruation was found to return periodically with a true or *quasi nisus* and flow after removal of the ovaries. After the same manner and under the same centric influences as that, sensations are felt in the amputated limb, even for years after the removal of the part in which the sensation is experienced. In the latter case, it is the centric endowment manifesting sensation in the phantom of the lost limb, exhibiting itself often painfully, in toes, and instep, and ankle, and all other parts to the consciousness of the subject; while in the former, on account of the special endowments of the ganglionic element controlling the bloodvessels and nutritive activities of the uterus—the manifestation was one of congestion, change of tissue, and a continuance of the periodic blood-flow even though the ovaries, the ordinary medium for the transmission of their excitation, had been removed. The vaso-motor reflexes of the uterus as excited in the mammary gland and in the ovaries, and even in the parotid gland, were illustrated by cases fully presented at the time, in two of which menstruation was awakened in early childhood, and in another sterility

seemed to be overcome by awakening the uterine activities through the establishment of lactation in an infertile woman. I was much pleased to find that in the last volume of the *Transactions*, in a paper entitled the "Infantile Uterus," Dr. A.W. Johnson has adopted the same line of reasoning and attributed the continuance of menstruation after extirpation of the ovaries to certain influences acting through nervous filaments distributed to the uterus.

The Nervous System in the Animal Economy.

Reference to the foregoing discussion has been made more rather as an introduction to the study of the nervous system in its relations to our subject, than as an actual illustration of the principles we hope to evolve. Such illustrations and analogies are best and more forcibly presented when taken from organs, in which its controlling influence is more obvious and familiar.

The high controlling influence of the nervous system in all organic processes of the animal economy is universally admitted, and though it has been claimed that particular acts of nutrition and of secretion are completed with a certain degree of self-government in the organic cell, still many facts prove that even here it is questionable whether these instrumentalities are not also dependent for their normal and efficient action in the maintenance of the histological structure and for the part they take in secretory processes to the direct or remote influence of the nervous system.

All functional activities and organic processes whether simple or complex, are performed with regularity and exactness so long as the nervous centre originating, and the tubular cord conducting the required influence, remain normal and intact.

The ordinary phenomena of sensation and of motion; the more complex innervation of the organs of the senses, alike depend on the normality of their form and structure, and the

due performance of their functions upon the integrity of the apparatus controlling their nutrition and conducting their activities.

Experimental research, accidental injury, and the results observed under morbid processes, have rendered the eye, more perhaps than any other organ of the body, a valuable subject for illustration and comparison with the results of defective, aberrated, or perverted innervation, such as may be applied to the abnormalities of the reproductive system. Like the assemblage of organs set apart for propagation of the race, it is devoted to a special object: it is complex in its organization like this system, but answers our purpose more particularly on account of its complexity of both structure and function being controlled by a nervous apparatus, which like that of the reproductive system is composite and complete within itself.

Alter, by experiment, disease, or accident, any portion of the nervous apparatus of the eye, and the result is in exact accord with the functional intent of the nerve so injured.

Section or disease, whether centric or tubular, of the optic nerve, will produce amaurosis, while the structures and circulation and nutrition of the eye will remain intact, and the clearness and transparency of the cornea will be preserved.

Sever or paralyze the inner branch of the motor oculi, or the abducent or sixth pair, and you have divergent or convergent strabismus, which, let me remark here, may be regarded as analogues of some anteflexions and retroflexions[1] among the distortions of the uterus—paresis of the posterior muscular wall giving rise to the first, and of the anterior to the second. But it is when we come to consider the effect of experimental, morbid, or traumatic impressions made upon the ganglionic or vaso-motor supply of the eye upon its circulation, secretion, and nutrition, that we find the aptest and most plausible ground for stating that uterine and ovarian

[1] See Fredrick Eklund: Stockholm. Stem in uterine flexions.

nutrition and development, both organic and functional may fail when deprived of, or curtailed in their neuro-dynamic influence.

As far back as the days of Pourfour du Petit (1732) and of Dupuy, and later by Magendie, Alcock, and others, experimental research has been made on the effect of injuries on the spheno-maxillary or Meckel's ganglion on the circulation, secretion, and nutrition of the eye, and it was found that in accord with the amount of injury to the vaso-motor or nutrient ganglion the eye became congested and bloodshot, the cornea opaque and dry and necrosed, so that disintegration and destruction of the organ were the result of interfering with its nutritive supply by injury to the ganglionic centre.

Thus it will be seen that the eye with its endowments of special sense, common sensation, muscular control, and its admirable philosophical apparatus for reflection and refraction, was indispensably furnished with an apparatus in the form of ganglia placed conveniently near for the control of its circulation and nutrition, the disturbance of which, or failure in the energy of which, invariably interferes with its structural normality and compromises its functional intent. What we here recognize in regard to the nervous control of the nutrition of the eye, when compared with the same functional activities pertaining to the uterus and other organs of the reproductive system, is but a miniature likeness representing a colossal statue.

The Nervous Apparatus of the Reproductive System.

Before entering upon any discussion of the nervous system and its deficient or aberrant action as a factor in the infertility of women, it is desirable that we have before us some comprehensive outline of its anatomical arrangement, and to present the vast amount of nerve force and the kind of neuro-dynamic energy required for the fulfilment of the demands

made upon it in the performance of its most complex and entirely unique function, as found indispensable to the continuance of the race. Besides other anatomists and observers antedating them, Robert Lee, Frankhaüser, and Courty give us good anatomical descriptions of this portion[2] of the nervous system. From this last author I found it most convenient to quote: "The nerves of the uterus and ovaries, according to Frankhaüser, arise directly and indirectly from the cœliac through the intervention of the renal plexus, which through its inferior ganglion is distributed to the ovaries and spermatic ganglia. The aortic plexus by its upper part (superior mesenteric plexus) supplies these spermatic ganglia, which would be more correctly designated genital ganglia. These ganglia, four in number, receive two large branches from the great sympathetic, and give off a great number of nerves to the ovaries. Below the origin of the inferior mesenteric artery is the great uterine plexus (lumbo-aortic), which descends to one centimetre from the division of the aorta, and is formed of the principal branches of the genital ganglia with the addition of small branches proceeding from the four lumbar ganglia of the great sympathetic. On the promontory it is divided into hypogastric plexuses, which are joined by branches from the terminal ganglia of the sympathetic, and are situated behind the rectum, on the inner side of the pelvic vessels, and are distributed to the lateral borders of the cervix uteri. Each hypogastric plexus measures from seven to ten centimetres, and in its course supplies branches to the meso-rectum, to the mesentery of the sigmoid flexure, and to the ureter. There is a large cervical ganglion on each side of the neck, easily discovered in the newly born, even without preparation, but covered in adults by the pelvic fascia and superimposed nerves. It extends downward as far as the folds of Douglas, and measures in the empty uterus about two centimetres in length and one in breadth, and during pregnancy five centi-

[1] The Uterus, Ovaries, and Fallopian Tubes, by A. Courty, 3d edition, p. 37.

metres in length and two or three in breadth. The greater number of the uterine nerves arise from these two ganglia, the rest coming directly from the hypogastric plexus. The cervico-uterine ganglia receive their afferent branches not only from the hypogastric plexuses, but also from the second, third, and fourth sacral pairs. They supply branches, not only to the uterus, but also to the vagina, bladder, and rectum. Besides these principal ganglia, there are on each side two small ones for the urethra and bladder, the latter sending some branches to the anterior surface of the uterus. The nervous branches from the cervico-uterine ganglia enter the cervix horizontally; passing upward they pierce the inferior portion of the body obliquely, whilst above, along the borders of the uterus, they run almost vertically, uniting with each other in the thickness of the anterior and posterior walls; they also anastomose with the ovarian nerves. The ramifications of the uterine nerves may be traced as far as the mucous membrane in the neck, but this cannot be done in the case of the body. Frankhaüser has found motor fibres in the uterine plexus, but he has not been able to discover sensory fibres. It seems impossible to distinguish the filaments arising from the cerebro-spinal and ganglionic systems."

From a consideration of the above rehearsal of the anatomy of the reproductive nervous system, it will be recognized that there is a vast predominance of the ganglia and plexuses of the nutritive or vaso-motor system over the cerebro-spinal element, though it is well known, as carefully pointed out by Tyler Smith and others, that sensori-motor nerves play a prominent part in some of the important activities of the uterus.

Even were we not already familiar with the functional complexities peculiar to the reproductive organs, a simple examination of its nervous supply and a consideration of the *kind* of nerve force appropriated, we would easily predicate that the organs so furnished would be endowed with great fluctuations of vascularity, with vast powers of nutrition and of trophic development.

Uterine and Ovarian Development and their Future Functional Activities dependent upon the Ganglionic System.

What, then, are some of the important processes confided to, and what are the demands made upon this complex, multiplied, and powerful apparatus of neuro-dynamic energy? The first and by far the most important demand made upon it beyond the ordinary processes of nutrition is at the age ordinarily of, from eleven to sixteen years of the female—when its energy is taxed for the development of the organs of reproduction. It will be acknowledged that this is by far the most important work of this complicated assemblage of ganglia and plexuses, which, in the words of Bichat, "is to preside over and superintend the thousand secret operations of a living being," for now, the convoluted and anteflexed rudimentary uterus is to be developed into the ideal and well-proportioned organ of nidation heretofore described (Sims), and the granular nodules foreshadowing the ovaries are to be perfected into the true organs of ovulation to furnish fertilizable germ-cells during the future life of the woman. Any failure in full response to this demand, or any diversion or misdirection given to the nerve force ordained for the purpose, will end in failure of development; the ovaries cannot furnish proper Graafian vesicles; the Fallopian tubes may be imperforate and the uterus stunted and flexed, with conical, projecting, or dwarfed cervix, with constricted or imperforate canal—the whole condemning the future woman to barrenness for life; no ovulation, no menstruation, conception and gestation hardly to be hoped for.

Nervous Control of the Normal Functions of the Reproductive Organs.

The nervous system in the normally developed reproductive organs does not so immediately concern the objects of the

present paper. Under its government the periodical returns of ovulation and of menstruation are regularly and normally conducted, and to interruptions in this nervous supply, doubtless, many of the disturbances of these functions, and through them infertility itself, are often to be attributed.

But the most complex, and, we may say, the most gigantic exhibition of neuro-dynamic energy, is seen in gestation, in the development of the uterine structures from a weight of one ounce and a half to four or five pounds, its trophic power in the government of vascularity, in the development of tissues, cellular, muscular, fibrous, and mucous, to prepare it for nidation, for the nutriment and growth of the fœtus; its enormous muscular power, as exhibited in parturition, and lastly, its miraculous return to almost its original weight by involution, whereby it is restored to its original conditions, both organic and functional, find no parallel in the exercise of, and marvellous capability of, nerve-force anywhere throughout the entire animal economy.

Etiological Considerations.

If in the foregoing presentation it has been shown that the development of the reproductive organs of the female at puberty is dependent upon the nutrient and trophic energy exercised by the ganglionic system at this important period, and further, that any failure or diversion of this energy is calculated to result in the various forms of stunted development recognized everywhere as the most frequent concomitants, if not causes, of sterility, it becomes an object of very high importance to inquire into the influences and causes which seem more obviously calculated to produce such interruption of the requisite nerve force.

Conditions of Life.

It is an observation perhaps too trite and familiar to bear extended comment, that in wild or savage and uncivilized

states, women enjoy the same immunity from sexual diseases and disturbances in the functions of the reproductive organs, and from difficulties in their parturition, somewhat as do the lower animals.

It is known that the Indians of North America exact of their women nearly, or all, of the work necessary for the cultivation of the field, carrying wood, or other burthens, while the men are occupied in the hunting grounds, and in more worthy warlike pursuits. It is said they seldom suffer from sexual derangement, and even in advanced gestation keep up with the trail on long marches, and when taken in labor detain the march but little, or not at all. They seek some stream, if near, and without assistance are delivered, and return with the infant to take up the march with the band :

> "So easily she yields her bosom's load,
> You'd almost think she found it in the road."

This may be regarded as an attractive romance adjusted to the popular belief in whatever is marvellous; but even the popular traditions of the common people have each a modicum of truth in them, which is, at least, significant of, though not to be accounted as a demonstration of the facts in question.[1]

Life on the Southern Plantations.

My own observation of the effect upon female health of an open air and active physical life comprehended that which may be considered the best ordered and most humane period of American slavery, viz. : that which covered the period of about twenty years preceding the war between the States. Regular and not undue work was required of the women ; they were protected by sufficient clothing, and their food was abundant and nutritious, care for their moral and religious

[1] Interesting information on the subject of parturition among savage nations —which is only incidentally related to our theme—may be found in the valuable work of George J. Engelmann, M.D., of St. Louis: Labor among Primitive Peoples. J. H. Chambers & Co., 1883, St. Louis.

conditions was not forgotten, churches were provided on each plantation, and marriages were encouraged among them. Physicians were employed to attend them, and in every way an enlightened view of both the interest and the duty of the masters secured to them whatever was necessary for their physical health, comfort, and well-being.

From my own personal observation, and from frequent interchange of experience with medical men engaged in attendance upon patients of this class, the almost entire immunity from sexual diseases among the women, freedom from menstrual disturbances and other uterine derangements, has been with me a carefully recorded history pertaining to the earlier days of my professional life.

In a private infirmary for the treatment of negroes, both men and women, established in 1850, by my brother, the late Dr. Robert Campbell and myself, during the eleven years to 1861, of its active operation, we received for treatment a considerable number of women from plantations in Georgia and other Southern States, who were the subjects of sexual diseases, but it is remarkable (by notes found upon the record book of the hospital) that seldom was a field-hand or out-door laborer the subject of these diseases, or of accidents supervening upon labor. Our patients came usually from the class more favored, as the housemaids, the seamstresses, or the nurses, whose lives and mode of in-door occupation differed but little from those of the mistress and daughters of the household. Such domestics, it can be remembered, were selected from the females of the plantation in early childhood, taken into the household, carefully raised, often petted, and seldom allowed to leave the house, or to associate with, or lead the life of the other children of the plantation.

Childbearing on the Plantations.

The fertility, prosperous pregnancy, and natural and easy parturition everywhere observed in women subjected to

active life and out-door toil were exemplified in my observation of the women on the Southern plantations. Their work in the field, either with the hoe or with the plough, was generally continued to within a few days, and often up to the very day or hour of labor, without compulsion on the part of the owner or remonstrance from herself. Except in difficult cases, and they were extremely rare, a physician was never present at the labor. Each large plantation had its midwife or "granny," to whose care all cases of labor were confided, and who was often sent for to be present at the labor of women on neighboring plantations, and not infrequently officiated at the birth of children in the master's family, when from motives of primitive modesty she was preferred to a male accoucheur. The amount of obstetric knowledge and skill possessed by these grannies was *nil*, which was fully sufficient for all the duty required of them, and the duty was always best performed when they did *nothing*. Unlike the custom which seemed prevalent among the Indians, where no time was given the woman as a recognized period for rest after labor, by established custom the negro women on the plantation were allowed a full month for what was called her "confinement," and though she was generally up in a few days, attending to the wants of her children and other duties of her cabin, the full month of privilege was claimed, and she scarcely ever returned to work in the field for even the lightest duty, till after the time had expired

The number of children in these families was quite remarkable; some of them numbering twelve, thirteen, and even eighteen and twenty children conceived and born under the circumstances herein related.

In what striking contrast do we find this vigorous fertility in lower and unintellectual grades of humanity when we consider them in comparison with the women of the higher classes, the educated, cultivated, and refined. Each marriage is a lottery in which the birth of even the first child is too often an unexpected prize.

Though the rationale of the process through which such perfection of organic development and of functional activity have been attained in the rude nomadic life of the Indian woman, and the less exposed and more systematized, but not less laborious living of the negro women of the southern plantations—cannot perhaps be satisfactorily elucidated, still it is impossible to evade the conclusion, first, that such modes of living are intimately and etiologically connected with this organic and functional perfection of these women; and secondly, that any mode of life which would contravene, or in any way deprive the woman of the beneficial influence so secured, should be expected to arrest or stunt the development and aberrate the functional activities of the reproductive organs. At the present we will be content to suggest that the influence in either case, whether favorable or adverse, is profoundly operative through the trophic or developmental function of the ganglionic system.

The Higher Grades of Social Life, Education, Dress, and Society.

Much that is valuable has been written, but now become too familiar, perhaps, to be heeded, on the adverse influence of many of the customs of society upon the present and future health, especially of adolescent females subjected to them. To these customs or habits, or, as they may be called, "innocent vices," it is scarcely pertinent to do more than to refer in a general way, that while they may serve to embellish and beautify, and perhaps make attractive in a certain way the subjects of their influence, they are most of them calculated to arrest sexual development and to degrade, if not nullify, the fertility of the future woman.

Modern System of Female Education.

The most unfortunate requirement by which female education is conditioned, as related to the interest we are discussing,

is the particular period of life during which it is necessarily most actively conducted. From the age of eleven or twelve to that of fifteen or sixteen years is ordinarily the time appropriated to the higher branches of education. The child exchanges her elementary school and simpler studies for the seminary or the female college where, in the curriculum, we may find algebra, geometry, physics, political economy, intellectual and moral philosophy, logic, rhetoric, often Greek and Latin, and one or more of the modern languages, besides music, and drawing, and painting. It will not be claimed that any one girl is expected to undertake this formidable array of difficult, and many of them, abstruse studies. They are, however, set before her, as most desirable attainments, and each one, or several, or all of them are within her reach, and the sure reward of untiring and devoted study. Her ambition is excited, a spirit of emulation is engendered, diplomas, medals, and honorable prizes add their quickening influences to stimulate her flagging energies, and thus they hold on their career, brilliant and profound to the end of the exciting and all-absorbing course.

Our female seminaries and colleges are undoubtedly most successful in producing women of the highest intellectual type, in producing women fitted for the companions and counsellors of the most brilliant and profound men;—successful in producing women who are ornaments of our social system, and women who, with kindlier and gentler intuitions than those of men, reinforced by superior intellectual culture, will, in time, influence for good our national counsels; but as opposed to all these desirable results, let us examine into some of the probable disadvantages attending the modern system of female education. May it not have perverted their destiny and lessened their chances of maternity? I have just said that the most unfortunate requirement of female education is the time at which it is most actively to be conducted. It will be remembered that this term from eleven to sixteen years is the period of sexual development and of the perfecting of the

organs of reproduction; not only are the organs themselves to be developed and perfected, but the nervous apparatus, the producer of the nervous energy which is to develop these organs, and which is to supply the force to originate and to preside over their functional activities during the entire child-bearing life of the future woman, is itself expected to undergo such evolution and development as will fit it to be the neuro-dynamic machine for carrying on all the complex and recondite operations and changes that can alone be accomplished by the exercise of the nerve force it is to furnish.

When Trophic Nervous Influence is Interrupted or Diverted at Puberty, Development must be Arrested and Functional Activity Prevented.

In the ovaries and uterus of the infant and the child, ovulation and menstruation and fecundity are but potential endowments, which under favorable influences at a certain period of the life of the individual are to become real. Until the period of pubescence, the attributes of the hypogastric plexus are but those required to preside over the ordinary nutrition of the organs they supply; the inherent endowment peculiar to them, by which they are to develop the generative organs and conduct their complex activities during the life of the woman, is but potential, and only to become real, it appears to me, under favorable conditions and proper influences at that particular period of the girl's life known as the age of puberty. Should they fail or be interrupted in their own development, *from any cause whatever*, the organs they are to develop fail also; the functions they are to conduct and preside over never come into activity. Ovulation will be sparse and feeble, menstruation scant and irregular, or may never appear, while fecundity, conception, and nidation are never to be expected. Such is the *rationale* and this the realization of natural, or, what I ever prefer to call it, atrophic sterility.

The Years of Pubescence Passed without and with Intellectual Labor Compared.

But few words are necessary to develop the significance of this portion of our etiological discussion. It has been seen that in the rearing of women under the wild, or savage, or half-civilized conditions of Indian life, and also under the more systematized, active, and laborious out-door life of women on the southern plantations, in both of which modes of life the years of pubescence or sexual development were passed in bodily activity and without mental strain; the reproductive organs are naturally and promptly developed, their functions normally performed, gestation prosperous, parturition easy, and offspring numerous. May we not legitimately conclude that conditions so entirely opposite and adverse as those in which the adolescent female of the better class must pass the period naturally allotted to sexual development, may be considered a potent factor in the arrest of ovarian and uterine development, by diverting the vital forces from the sexual organs, at the very time that their exercise is most needed, and concentrating these energies in the brain for the development and culture of the mental faculties. Without statistical record, demonstration will be impossible, but when such record shall have been made, the infantile uterus and atrophic sterility will be found, I think, more frequently among those women who have been subjected to severe and laborious intellectual labor during the period of pubescence, than in those of any other class. Unless active out-door exercise and diversion become recognized and important elements in the institutions for female education, the pupils will be liable to feeble sexual development, the alumni irregular and disturbed in their uterine and ovarian functions, and the prize girl will fulfil the destiny of a childless woman, while the ever-chided and irrepressible Tom-boy, will be like the famous character of the nursery rhyme, who had "so many children she didn't know what to do."

The Pernicious Influence of Female Attire on the Organs of Reproduction.

Much that is overstrained and exaggerated, and yet much that is true and worthy of attention has been recorded in works of physiology and hygiene on the effect of female attire in contracting the thorax and obstructing normal respiration, in interfering with the digestive and nutritive processes, laying the foundation of tuberculosis and other forms of wasting disease. There is no doubt in regard to the influence of such compression upon the organs of the pelvis and the close impaction of these organs, especially in the earlier periods of life. Those who may have escaped permanent atrophy of the sexual organs from such causes as above described, and in whom the development was but *delayed*, are often irreclaimably condemned to sterility by this unnatural impaction of the pelvic organs. The uterus, an organ naturally enjoying freedom of motion and mobility in every direction with no interference with the conditions of either its blood supply or with its innervation, is borne down and compressed in the lower plane of the pelvis by the superincumbent mass of viscera, its original ante-curvature converted into anteflexion, the cervical canal constricted, and the entire organ stunted and displaced. In the philosophy of dress, Moore, the poet, seems to have known well how to contrast the good with the bad.

Lesbia wears a robe of gold,
  But all so close the nymph hath laced it,
Not a charm of Beauty's mould
  Presumes to stay where nature placed it!
Oh! my Nora's gown for me,
  That floats as wild as mountain breezes,
Leaving every beauty free
  To sink or swell, as Nature pleases!

. . . . . .

Nature's dress
Is loveliness—
The dress *you* wear, my Nora Creina.

Acquired Sterility.

It had been my intention to present as a part of the general discussion of the infertility of women, certain considerations growing out of my own experience on the subject of what has been generally recognized under the name of acquired sterility; but the length of the paper, and we may say the entire divergence of the considerations relating to atrophic or natural sterility from those that would be required in that more varied and less obstinate class of cases, would seem incongruous, to appear under the same general head. While the treatment required may sometimes be the same in the one class as in the other, in their etiological relations they are as widely different as can possibly be imagined. Except in cases of super-involution, atrophic sterility has but one, and its constant cause and origin, viz.: arrest or failure of development at the age of puberty, on account of interrupted or deficient innervation, while to state the causes and conditions giving rise to acquired sterility, would be to enumerate and to trace to their origin almost all the morbid conditions, both structural and functional, of the entire generative system, and its treatment would be simply a recountal of measures and procedures everywhere practised for correction of those various affections.

Considerations of Treatment of Atrophic Sterility.

In the foregoing discussion of the infertility of women, I have presented atrophic sterility resulting from whatever conditions of the uterus, whether from conical, pointed, stunted, flexed, contracted, or imperforate cervix, or from inadequate body of the uterus itself, or again, from unproductive ovaries, or from imperforate Fallopian tubes, the result of conditions, originating from and being continued by inadequate activity of the ganglionic nervous supply to the generative organs. Such conditions having such an etiology, will at once be admitted, as experience has realized, as not encouraging to

favorable results of treatment. Surgical and mechanical means, as amputation of the elongated cervix, discission, dilatation with tents, bougies, or the forceps in these atrophic forms of sterility, while they should be retained as important and perhaps indispensable parts of the management, cannot alone secure, as their frequent failures have realized, conception and pregnancy in an organ both structurally and functionally incompetent for nidation and gestation, by its undeveloped and paretic condition. The mere fertilization of the germ in a cavity so unfitted for engraftment and nidation, cannot be expected to supply all the requirements that have to be met in the well-developed and normally acting uterus. What then are the additional indications of treatment, and what the measures by which they are to be met?

The first, most important, and perhaps the only rational indication for treatment, however difficult of attainment, is to secure the full development of the uterus and other reproductive organs, which has been so long retarded. *Secondly*, as subsidiary, but indispensable to the carrying out of the major indication, is that which points to the awakening of the neurodynamic energies of the ganglionic plexuses upon which such development, as well as their functional activities, depends. Such are the two primary and fundamental indications inseparably related to each other, which the foregoing examination of the subject has led us to believe should be added to the present mechanical methods, and which should never be lost sight of, as beacon guides in the management of atrophic, or, in this relation, which I will call atonic, sterility. It may be naturally, and I may say reasonably, perhaps more doubtingly asked, especially by those who have thought most profoundly on the subject of the atrophic utero ovarian system, by what means do you propose to accomplish so forlorn an object as that of initiating and perfecting organic and functional development in a uterus and ovaries which have lost their opportunity of development at puberty, and that have remained infantile and inactive perhaps for years?

Though this paper has been presented, as stated in the beginning, more as an illustration of the present unsatisfactory results of the surgical and mechanical methods now depended upon in the treatment of atrophic sterility, and to suggest new methods of study, hoping to evoke more efficient methods of treatment, rather than to report successes in my own experience, I can, however, point to a limited number of facts and results relating to the subject, which add a hopeful encouragement to efforts at treatment, such as indicated by these studies.

Superinvolution.

Atrophic conditions of the uterus do not always occur as the result of arrested development at puberty; for instance, the progressive atrophy of advanced age and superinvolution from causes connected with prolonged or difficult parturition. It is said, also, sometimes to occur after the operation of trachelorrhaphy—in this case the progressive atrophy is most probably due to injury of the two cervical ganglia, placed laterally on either side of the cervix, and upon which the uterus depends largely for the conduct of its nutrition;[1] these being injured or destroyed, either at the time of the laceration, or during the paring and suturing of the operation for repair. Superinvolution of the uterus is sometimes caused by over-distention of the organ during pregnancy, by amniotic dropsy as illustrated in a case presented by myself, during the discussions of this condition before this Society in 1883, the woman bearing children regularly up to time of the occurrence, but remained infertile ever afterward, on account of the superinvolution supervening upon the dropsical distention.[2]

The opportunity for treatment in the case referred to above was not afforded, and probably the injury done to the nervous and muscular structures of the organ, by the extreme disten-

[1] Robert Lee.

[2] See Transactions, 1883, vol. viii. page 80.

tion, was such as to preclude the hope of restoration to fertility by any method of therapeutic effort. But the atony and atrophy which constitute superinvolution, do not always supervene upon injuries of gestation or of parturition, so serious as not to be amenable to restorative treatment, and sometimes of the most simple and even not very energetic kind: Dr. Joseph Eve Allen, formerly assistant to the chair of Obstetrics and Diseases of Women and Children, in the medical department of the University of Georgia, kindly furnishes the notes of three cases of superinvolution after severe labor. In each one of these cases, the atrophy of both neck and body of the uterus was marked, though previously regular and natural in menstruation and each one, the mother of children previous to the injury, became regular, the uterus recovered its normal size and condition, and childbearing was resumed, after protracted amenorrhœa and infertility—one for over three years.

The treatment in these cases consisted in the frequent application of bougies and probing of the uterus, combined with tonic remedies as iron, quinine, and strychnine, and nutritious food and regular exercise in the open air.

Nulliparous Sterility, independent of Atrophic Conditions.

There is a class of nulliparous women which I must not omit to refer to in this connection. They cannot be said to be cases of acquired sterility, nor, again, can they be placed with those who represent the class of atrophic cases—married for years; they have borne no children nor have they ever conceived. Often ovulation is sparse and menstruation scant, irregular, and painful, or sometimes entirely absent. On examination the uterus appears to be of normal proportions and often free from inflammatory conditions or structural change; yet from the period of puberty or perhaps shortly after, the uterine

disturbances and irregularities have continued to exist. Emotional or hysterical excitement in greater or less degree is frequently manifested. There is often pain in one or other of the ovarian regions; either before or after the menstrual nisus or flow, as the case may be.

These cases are evidently of neurotic character and origin, and the morbid manifestations are the result of perverted functional activity, rather than such as result from defective organic development. This class of cases is far more amenable to measures of treatment than the atrophic cases to which this discussion has been principally devoted, and from it—were we making such a report—most of our successes, in the relief of sterility in nulliparous women, would have to be derived.

A good proportion of these patients coming often from paludal regions of Georgia and South Carolina, present complications of malarial and other toxæmic conditions which require attention in addition to the local treatment found necessary to restore healthy functional activities of the reproductive organs. For some time past I have found electrization, both local and general, a valuable adjunct to the treatment of these cases.

Atrophy of the Uterus dating from Puberty.

Mrs. C. G., aged twenty-two years, married two years, without children; menstruation irregular, scant and painful. On examination the uterus was found small and undeveloped, with a minute os and contracted canal; a bent uterine probe was with difficulty passed into the cavity, which measured less than two inches from os to fundus. Under careful palpation, the body felt no larger than an ordinary horse-chestnut, flattened and triangular. The mother of the patient told me confidentially that her daughter was very desirous of having offspring and that in her opinion, if she could have one child,

her health would be fully established. To the conditional portion of her remark I fully assented; but told her candidly, that while her general health might be improved by local and constitutional treatment, I did not hope that she would ever conceive or bear a child, as the womb was undeveloped and, indeed, was what is called an infantile uterus. As the patient was pale and anæmic, and had recently lived in a malarial region of the State, I put her upon the following tonic treatment:

℞—Vallet's mass	ʒiij.
Quinine	ʒij.
Arsenious acid	grs. iij.
Solid extract of ergot	ʒj.
Strychnine	gr. j.

Mix and divide into sixty pills.

Sig.—Take one pill three times a day, before meals.

The local treatment consisted in moderate dilatation of the cervical canal with bougies, for the purpose of introducing a uterine electrode.

This was one of the periods, 1872, in which I had returned to the application of electricity as a therapeutic agent. In the then crude and undeveloped condition of the science, pertaining to its therapeutic action, galvanism had acquired some credit for promoting the menstrual flow, and with this view and entirely empirically, I made application of this agent to many cases. In the case of Mrs. G. an instrument known as the galvano-faradic battery, was used twice a week, one sponge electrode being applied sometimes to the lumbar region and sometimes to the pubis, and the other within the uterine canal. These applications and the tonic treatment were continued during three inter-menstrual periods. These menstruations were much more profuse, and attended with little or no pain and in the fourth interval it was considered prudent to withhold the use of the electrode, as menstruation had not appeared. The patient was soon found to have conceived, and was delivered of a healthy child at full term. She has since borne

four children. In my examination afterward to determine the fact of pregnancy, I found the uterus much improved in size and general development, but do not know whether the development had begun previous to conception or not. Indeed, I did not connect such increase at the time, with the effect of treatment in any other way than in the establishment of menstruation and the general improvement of the health of the patient. In the following case furnished by Dr. John S. Coleman, of Augusta, Ga., better opportunity for observation of the effect of the electricity in the development of the uterus was allowed previous to conception: Mrs. X. M. A., Jewess, aged about twenty, married one or two years, was in apparently good general health, except a strong inclination to obesity. She had menstruated irregularly and scantily or not at all. On examination the uterus was found to be infantile and undeveloped. Applications of electricity were made by uterine and sponge electrodes from a galvano-faradic battery twice a week for several months. The uterus increased in size, the canal became less constricted, menstruation became more abundant, and the function seemed fully restored. This patient became pregnant some months after treatment, and has borne children regularly since that time, 1873.

In the foregoing cases, both those of superinvolution, and those of aborted development at puberty, the recovery of uterine normality of structure and function in the acquired atrophy, and the awakening of development and functional activity in the arrested development of the others, seemed to be occasioned by the stimulating influence of the local treatment, combined with the tonic. M. Courty is quoted as attributing to sponge tents, an influence promoting, in cases of subinvolution, the process of involution, by which, the organ is reduced to its normal proportions; it is highly probable, that in the cases furnished by Dr. Allen, the frequent probing and dilatation with bougies, under the action of the tonics, awakened through the large cervical ganglia, a process of *evolution*, which restored the growth and functional activities of the

superinvoluted uterus. The mechanical stimulation of these powerful nerve centres by the bougies, and the sponge tents, is doubtless a potent factor in awakening trophic action in the tissues of the uterus, every part of which is supplied by filaments sent from these ganglia.

In a considerable number of the cases of sterility in women who have borne children, and in whom neither dilatation nor straightening is required, I apply the uterine *stem* and allow it to remain during the night with the distinct object of awakening the functional activities of the uterus by the prolonged mechanical stimulation through those intrinsic nerve centres located in the cervix. The beneficial result of this device has been marked in several such cases. My own soft-rubber spring stem pessary is the form most used by me for this purpose. In a woman sterile after ten years of marriage, now advanced in pregnancy, the stem used as a stimulator after dilatation appears to have been influential in promoting the present fortunate result. I must add here, that in one delicate and nervous woman reflex nausea and vomiting without any local pain were occasioned after three or four hours' presence of the stem. This promptly ceased after the withdrawal of the irritant.

Electricity in Uterine Atony and Atrophy dating from Puberty.

It will not be overlooked that the use of electricity in the two cases above reported, the application of which appeared to be so quickly responded to, by awakened activity, both organic and functional, was after a method far inferior to the more advanced, systematized, and thoroughly controlled methods governing the application of this powerful and widely available therapeutic agent, as applied by myself and others at the present day. If with instruments comparatively primitive, by empirical application, we have found electricity

competent to secure what seemed to be such satisfactory results, how much more may we hope to accomplish by the systematic and enlightened therapeusis of this agent as perfected by Remak, Apostoli, Tripier, Mundé, and Engelmann, when guided by the definite principles in regard to the nervous instrumentalities concerned in atrophic sterlity, such as we have earnestly endeavored to establish by the foregoing investigation?

REPORT OF A CASE OF PREGNANCY IN THE RIGHT HORN OF A UTERUS BICORNIS,

Treated Successfully by a Modified Cæsarean Operation, Twelve Months after the Death of the Child at the Full Term of Gestation: So-called "Missed Labor."

By B. F. Baer, M.D.,
Philadelphia.

The case whose history is here related is one of unusual interest, and in some of its features probably unique.

On June 11, 1885, I was consulted by Mrs. L. O. She had been sent to me by Dr. G. D. Nutt, of Williamsport, Pa., who had diagnosticated extra-uterine pregnancy. She was then twenty-six years of age and had been married four years. She had one child a year after marriage, at the full term, after a normal labor. The child died when three months of age from cholera infantum. She then menstruated regularly until about September 1, 1883, after which time the catamenia were suppressed and she considered herself pregnant. In due time the morning nausea and vomiting, mammary signs, abdominal enlargement, quickening, and all of the other signs of normal pregnancy occurred in regular order. The abdomen continued to increase in size until she was as large as at full term, but the enlargement was greater on the right side than on the left. Fœtal movements were active and strong, but did not impress the patient as unusual. She did not have the slightest hemorrhagic discharge from the uterus, nor did she suffer any pain during the entire course of the gestation. She did not have a

suspicion but that she was normally pregnant, and she anticipated a normal labor as with the first pregnancy. During the first week of June, 1884, when she was about the full term, and hourly expecting to go into labor, she was taken with sharp pain in the right side of the abdomen; she felt something give way, and the movements of the child, which had been unusually active, suddenly ceased. She became faint for a time, but soon rallied, and there was no further evidence of shock. Labor pains began almost simultaneously with these phenomena, and she sent for a physician, Dr. J. W. Sheets, of Northumberland, Pa., who kindly sent the following reply to a letter which I addressed to him after the patient came under my care, and which I received on the day of the operation.

"My dear Doctor: Yours of the fourteenth instant received. On June 9, 1884, I was called to see Mrs. O. for the first time. She had been in the care of another physician of this place during what he and she supposed to be the later stages of natural pregnancy. For some reason the family became dissatisfied with him and sent for me. I found her losing a great deal of blood from the vagina, and suffering from pain in the region of the uterus. Examination revealed what appeared to be a dilatable os, but rather of eight and a half months than full term. I ordered quiet and opium, and the next day found the patient easy but still losing blood. I now examined her more closely. She had the appearance of a healthy person in the last month of utero-gestation. The fœtal heart sounds were strong and apparently natural—at least, I was satisfied such was the case at the time. The next day, the third from the time I first saw her, she was up and assisting her husband with some light duties in his bakery. I did not have an opportunity to examine her thoroughly after that. There seemed an unusual condition, but her freedom from all peculiar symptoms until what I considered near the full term of gestation, and the natural appearance externally, led me to advise her to await development for a short time. The second week the husband called to pay me, saying, 'we move to-morrow.' This was June 23. They moved to Towanda, Pa., and several months afterward I received a letter from a physician attending her, in which he stated his conviction that Mrs. O. was the subject of an abdominal growth. I persisted in the presence of a fœtus, and if not in the uterine cavity it must be otherwise, but I was sure of a fœtus. I looked upon her case as one presenting very exceptional features. Nearly as I could ascertain, all through her pregnancy she presented no unusual

symptoms, and only within a short time of what seemed to be the full term did she present any, and they not remarkable.

"Very truly yours,

(Signed.) "J. W. SHEETS."

The patient further stated that within a few days after the false labor in June the mammary glands became swollen and tense and milk was secreted; but it soon disappeared and the glands returned to the non-pregnant condition. The abdominal tumor began to diminish in size. In the meantime she was in comparatively good health, and had removed (as stated by Dr. Sheets) to a distant town. In the first week of July, just one month from the commencement of the symptoms described above, labor-like pains and metrorrhagia again set in, and the physician who was now called thought she was in labor. He said that the child had probably died in June, and that "missed labor" had occurred, but that the contents of the uterus would now be expelled. After two or three days, however, the pains and hemorrhage subsided and the patient went about.

The next month, and the next, "hard labor pains" occurred with the recurrence of the menses, and each time both the patient and her physician looked for the delivery of the product of the "missed labor." They were disappointed. But the tumor was becoming gradually smaller and more firm. At the fifth recurring menstrual period from the beginning of the trouble in June, labor pains were absent and she had a natural menstruation. It was at this time that her physician was so puzzled that he wrote to Dr. Sheets his belief that Mrs. O. had an abdominal tumor (non-pregnant). After this the catamenia occurred regularly, but the expulsive pains did not return. She was about, attending to her duties, but she gradually lost strength and flesh. A few weeks before she came under my care she was suddenly attacked, at midnight, by a sharp pain in the right hypogastric region, followed after a time by a fainting sensation and then cold (shock). She continued ill the remainder of the night and the forenoon of the next day, when she felt better; but the symptoms returned the following night, and every night subsequently, at about the same time, and continued as with the first attack. The pain also extended to the back and

down the right groin and anterior portion of the thigh. The patient presented a considerably emaciated and pallid appearance.

Inspection.—Patient in the dorsal position. The right side and centre of the abdomen were shown to be distended by a mass as large as the uterus at the seventh month of gestation. It was pyramidal in shape, larger above than below. The abdominal wall presented a dry, drawn, emaciated appearance. The iliac processes were very prominent. There was a wide, deep sulcus into which the hand could be laid between the left superior iliac spine and the tumor. A depression also existed between the right anterior iliac prominence and the tumor, but it was much smaller. The lower anterior surface extended downward and rested upon the right pubic ramus, apparently dipping into the pelvic cavity.

Palpation.—The upper portion of the tumor was easily movable from side to side in the abdominal cavity, but the lower portion seemed to have a deep pelvic attachment. It was smooth on the surface and appeared to be entirely free from the abdominal wall. It was firm, almost hard, and this fact, taken in connection with its smoothness and mobility, suggested uterine fibroid. Vaginal palpation showed that the uterus was elevated and placed somewhat diagonally across the pelvis, the cervix pointing downward and to the right, the fundus upward and to the left, the organ being apparently suspended from the tumor to which it was *loosely* attached. The uterus was unusually small and could be moved to a limited degree independently of the tumor, as though it had a broad-ligament attachment. A broad, ligamentous attachment could almost certainly be made out by bi-manual palpation. The cervix and os were quite small; the sound gave a measurement of two and a half inches, and showed the uterine cavity to be small; the uterus was apparently more cylindrical than flat. The lower surface of the tumor could be felt very distinctly by the vaginal finger. It was smooth, globular, and semi-fluctuating. There was dulness on percussion over the tumor; resonance on the lateral and upper borders.

Diagnosis.—The question of diagnosis became a very interesting one. It was clear that some form of ectopic gestation had existed. But it was also clear that it had not been of the ordinary

tubal variety of extra-uterine pregnancy, since the patient had not had any of the symptoms of rupture of the gestation sac, as pain, hemorrhage, discharge of decidua, shock, etc., which always attend that accident. The so-called abdominal gestation was also excluded for the same reason; for it is now a well-established belief that when this form of extra-uterine gestation does exist, which is rare, it begins as a tubal pregnancy. The tube ruptures and the embryo escapes, either into the abdominal cavity where it probably dies, or into the broad ligaments, where it may go on developing. The symptoms of rupture of the tube are, therefore, always present in these cases in a greater or less degree. Further, as the external covering is destroyed when the tube ruptures into the abdominal cavity, the chorion is without protection. Nature, therefore, imperfectly supplies this, if the product lives, by forming an adventitious inflammatory sac to which the chorion becomes attached. The gestation under these circumstances is always attended with great suffering to the mother, if indeed she escapes with her life. If full term is reached, the phenomena of labor do not occur and recur so perfectly as were here manifested. Again, when an inflammatory sac has been formed it is always closely adherent to the organs and tissues around it and to the uterus; therefore, the physical signs would be entirely different from those present in this case. There would not be the mobility of the womb, nor a non-inflammatory and apparently ligamentous attachment as was found here.

In view of the history and physical signs related above, I concluded that some form of abnormal pregnancy had existed and that the tumor contained a dead child; but I was puzzled as to the character of the sac. It could not have been tubal and reached term, as it did, without symptoms of rupture. It could not have been intraligamentous and reached term without having given rise to symptoms and physical signs, which were absent in this case. There was no doubt, however, as to the proper course of treatment. I advised laparotomy, and hoped, in view of the transverse mobility of the upper portion of the tumor, to be able to remove the sac entire, whatever its character might prove to be.

The patient was very anxious to have the operation performed, and she entered my private hospital for that purpose.

Operation.—On June 18th, assisted by Drs. J. Milton Miller, H. M. Christian, and J. D. Nutt, in the presence of Drs. J. F. Wilson, De Forest Willard, Latta, Day, and others, I proceeded to operate.

An incision three inches and a half in length was made in the median line below the umbilicus, and the tumor at once exposed to view. It was entirely free from adhesions everywhere, except at its lower portion. It presented a smooth, nacreous, glistening appearance, and resembled so much, at first sight, a thick-walled ovarian cyst that I, for a moment, questioned the correctness of the diagnosis. On closer examination, however, it was found to bo more vascular and deeper in color. An effort was next made to find a pedicle with the view of ligating it, but this could not be done as the tumor was found to have a broad base which dipped into the pelvic cavity and which appeared to be firmly adherent in that position. It was then deemed best to endeavor to reduce the size of the mass by evacuating the fluid contents of the tumor, and for this purpose I plunged the aspirator trocar into the sac. Its contents appeared to be almost solid, and nothing flowed through the canula. The instrument was now withdrawn, and at once pus began to flow from the puncture. An incision was then made into the sac, when pus flowed freely and continued until at least a quart was discharged. It was not fetid. I next introduced my finger and found a child filling the sac. The incision in the wall of the tumor was now increased to about three inches in length when several fingers were introduced. The child was fixed in the lower portion of the sac by its breech, which presented at the superior strait, with the back to the right side. The head was in the upper portion of the sac, the entire fœtal ellipse being sharply flexed upon its anterior plane. I endeavored to make version and deliver by the feet, but the fœtal mass was so fixed that it could not be moved without undue force. While making this manipulation the hands and arms escaped from the incision and I then endeavored to deliver by traction upon the head, which partly collapsed, the parietal bones slipping off. When the head was delivered, it was discovered that the breech and

back were firmly adherent to the lower and outer surface of the cyst wall. They were finally separated and the child removed, a portion of the skin and superficial fascia remaining attached to the gestation sac. It was necessary to clamp many bleeding vessels in the cyst wall.

The cyst cavity was now cleansed of blood and débris. The umbilical cord was attached to the posterior and right side of the pelvis, below the superior strait, where its atrophied vessels branched off in different directions. I could not find a placenta, but the cord was firmly attached. The placenta was doubtless likewise atrophied.

I now again passed my hand over the external surface of the collapsed gestation sac with the view of possibly being able to remove it, but it was found certainly to have a broad base which dipped into the pelvis, apparently spreading out in the direction of the uterus; the latter organ being loosely connected with the tumor. In addition it seemed to be firmly attached to the deep pelvic vessels. I determined, therefore, that it would not be safe to attempt its removal. The sac undoubtedly contained muscular tissue. Examining now carefully, the left ovary and tube were located to the left and deep in the pelvis; the right ovary and tube were not found. As I could not remove it, I decided that it would be safer to stitch the cyst wall to the abdominal incision. This was done by first passing the needle through the cyst wall and then through the abdominal wall, thereby coaptating the incised edges of the sac and, at the same time, bringing its outer or peritoneal covering in contact with the peritoneal surface of the abdominal wall. The cord was brought out at the lower angle of the incision and a drainage tube placed alongside of it. The wound was dressed with salicylated cotton, supported by adhesive plaster and a flannel binder, and the patient returned to bed one hour and fifteen minutes after the operation was commenced. The child was a full-term male and weighed, in this macerated condition, seven pounds.

There was not the slightest evidence of shock during the operation, and but little hemorrhage. When the patient was returned to bed her pulse was 104 and temperature normal. She soon recovered from the ether and asked about the result of the operation. During the next twenty-four hours she complained of

considerable pain, for which hypodermic injections of morphia were administered.

There is very little to record regarding the temperature and pulse in the after-history of the patient. She was practically convalescent from the beginning. Her temperature did not rise above 100°, and her pulse was never more than 112, usually about 100, until about the tenth day, when both temperature and pulse were normal. Her bowels were moved on the fifth day and she was permitted to take solid food in small quantity from that time on. The drainage tube was watched with considerable solicitude as was also the healing of the wound, and it is sufficient to state that the latter did not differ in any particular from the healing of the ordinary abdominal incision, as union occurred by first intention.

At 7 P. M. on the evening of the day of operation, about a tablespoonful of sweet bloody serum had been discharged from the tube.

June 19 (twenty-four hours after the operation). The notes state that the patient passed a good night, and that she felt better than at any time for weeks. The pain and backache are gone and she feels strong. She is bright and cheerful. No blood and very little serum from the drainage tube.

20th. Passed a good night; slept well. Passed flatus. No discharge from the tube. No tenderness on pressure anywhere. In the afternoon of this date it is noted that the entire dressing was changed for the purpose of examining more carefully as to the condition of the cord and also to learn whether there might be any difficulty along the line of the incision. There was not the slightest odor and no more staining of the cotton than after an ordinary laparotomy. The cord was undergoing further atrophy, but was still attached. About a drachm of serous fluid was drawn from the bottom of the drainage tube. A little carbolized water was introduced from the sponge, but returned unstained. The wound was covered with iodoform and the dressing replaced. Patient seems bright and well.

22d. Drew a quantity of fluid from the bottom of the sac. It is thicker and lighter in color than yesterday.

24th. Patient felt bright and well. Sutures were all removed except three or four immediately around the drainage tube.

Union seems to be perfect, and there is not the slightest sign of pus or odor.

26th. The glass drainage tube was removed and a small rubber tube substituted. Removed the remainder of the sutures; union perfect and solid Cord separated about an inch from the opening. There has not been the slightest tenderness on pressure nor tympanites since the operation.

27th. There was a slight discharge of healthy pus when the patient occupied the lateral position; ordered to remain in that position as much as possible.

28th. Dressed wound; very little pus, and that perfectly sweet. The incision had closed around the orifice of the tube track and the patient seemed not quite so well; a little feverish. I therefore passed a probe and found that the track extended deeply into the pelvis, but there was no further discharge. A small plug of lint was introduced and left in the orifice of the tube track.

29th. Temperature normal; pulse 94. Removed a few drops of healthy pus.

From this date there was quite a free discharge of a seropurulent, but perfectly sweet fluid, which continued in diminishing amount.

July 3. At this date there was considerable odor present for the first time since the operation. Irrigation with carbolized solution. In the evening of this date, temperature 100°; pulse 90. The abdomen a little tympanitic; no pain or tenderness. Vaginal examination made; first since the operation. The uterus was found a little to the left, as it was prior to the operation and perfectly mobile. There was no induration, and I could scarcely distinguish the remains of the sac. But I did not examine very thoroughly for it.

4th. During the night the tube became clogged. Temperature and pulse a little higher than yesterday. Temperature 99⅘°, pulse 100. Slight diarrhœa and evidence of digestive disturbance.

6th. Very little discharge from the tube. Sat up for the first time and felt strong and well. Did not want to return to bed.

16th. She went home (two hundred miles) on the twenty-eighth day after the operation.

The patient has remained well; yet, although three and a half years have now elapsed, there is still a small fistulous opening at the lower end of the incision. At each recurring menstrual period there was, for more than two years, a discharge of blood through the fistula, menstruation at the same time occurring in the natural manner from the womb. No pain or inconvenience was felt from this discharge of blood; on the contrary the patient was always relieved; and it was determined by the patient as well as her physician that the discharge from the fistula was of the ordinary menstrual character. It would continue during the period and disappear as the flow disappeared from the natural channel.

The following letter, dated December 8, 1888, will explain the patient's present condition:

"DEAR DR.: Mrs. O. says you wish to know how she is at the present time. There is still a fistulous opening, and although her menses do not now come that way, there is still a watery substance discharged. Her general health is first class. There is an abdominal hernia in the line of the incision.

"Yours very truly,

(Signed.) "J. D. NUTT."

At the time this patient came under my care I did not know of a single recorded case of pregnancy, which had reached term, in one horn of a uterus bicornis, and was not aware that any such existed. It was at that time the general belief among observers that the cases which had been described by the older writers as "missed-labor" (Oldham) were really examples of extra-uterine gestation; probably of the secondary abdominal variety. But the history and physical signs of this case removed it from that category, and I was therefore greatly perplexed as to the true character of the gestation. It was mainly for this reason that I did not at once report the case. More than a year after the operation and while I was still looking among the literature on extra-uterine pregnancy for a similar case, I happened upon the very interesting and in-

structive paper by the late Dr. Angus Macdonald, entitled, "Report of a case of pregnancy in the left horn of a bifurcated uterus," etc., which had been published in the *Edinburgh Medical Journal* for April, 1885. It now at once became clear to me that my case was of similar character.

In addition to his own case, Macdonald gives a brief account of two others, one by Litzman, of Berlin, the other by Salin, of Stockholm, and refers to one by Sänger. There also had been at that time a fourth case recorded, that of Wiener (*Archiv f. Gynäk.*, Bd. xxvi., heft 2, Greig Smith), but it had escaped Macdonald's notice. These fives cases, with my own, the sixth, include all the recorded operations, so far as I have been able to learn, for this rare condition; mine being the only one in America. It is worthy of note that they all occurred within a period of five years, and that each operator was unaware of the work of the others; and furthermore, that in not one of the cases was the condition fully understood. Macdonald, indeed, thought he was operating for fibroid tumor of the uterus, and did not discover his error until he was severing the pedicle, when a limb of the child escaped.

In Litzman's case, the first (February 14, 1880), "The diagnosis was retention of a mature putrid fœtus inside the uterus." The Porro-Muller operation was performed, but the patient died on the third day, from previously existing septicæmia, when the true condition was learned at the autopsy. The left horn with its corresponding tube and ovary was found within the pelvic cavity; the right had been removed with the gestation sac. It was therefore the right horn of a uterus bicornis which had been impregnated.

Salin was the second operator (June 17, 1880), but he did not, I believe, fully report his case until 1885 (*Hygiea*, 1885; translated by J. G. Tapper, M.D., Elgin, Illinois., *Annals of Gynecology*, Boston, September, 1888). He says, in speaking of the difficulty of diagnosis in his case, the symptoms of which had been much like mine:

"We had naturally, first of all, to suspect an extra-uterine pregnancy. Against this diagnosis were many convincing circumstances. The patient's general condition was very good. She had certainly lost in weight, yet still was quite plump, and could, without great suffering, remain about, a very great contrast to what many suffer in extra-uterine pregnancy. The fœtal tumor in an extra-uterine gravidity generally appears unsymmetrical in form, although these irregularities are difficult to outline with certainty; as nothing but the abdominal walls and the thin fœtal sac cover the fœtus, it is usually very easy to palpate. In this instance the tumor was perfectly symmetrical and round. Not a trace of the child, or any unevenness, could be detected in any part. . . . . Instead of the uterus being enlarged, as in extra-uterine gestation, it was here comparable to a normal virgin uterus. It was not closely applied to the tumor, but was distant and freely movable, by the side of which the hand could discover a pediculated structure passing from the uterus to the tumor. The decidua had passed away. Against the supposition of a new formation stand prominent before all else the patient's own feelings. It is undoubtedly true that women, during the period of active growth of abdominal tumors, frequently deceive themselves by suspecting pregnancy, and thus call forth these ordinary complex symptoms. The patient so clearly described her condition, in such a trustworthy manner, that we were compelled to give them credence; and added to this was the testimony of the husband, who informed us that he had distinctly felt fœtal movements, which confirmed her statements. Without these facts the enlargement of the mammæ, with secretion of milk on pressure, as well as the appearance of fresh, red colored striæ upon the belly, which do not generally appear without pregnancy, all spoke strongly. We were thus in doubt and could not establish a correct diagnosis, but our suspicions inclined mostly toward an extra-uterine pregnancy. The ordinary abdominal incision was made. . . . . During the time we were inspecting the tumor there oozed out through an opening, the size of a pinhole, in the wall of the tumor, a dirty-yellow fluid. Supposing the contents of the tumor to be of the same nature, a large ovarian trocar was introduced, but no fluid flowed out. On withdrawing the trocar a fœtal part presented itself. The opening in the wall

of the tumor was then enlarged both in an inward and downward direction. . . . . We afterward endeavored to bring the tumor outside of the abdomen, which was very easily accomplished. To our astonishment we then found a ligamentum latum, with a normal tube and ovary, springing from the right side of the tumor. We had, therefore, to deal with a double uterus, of which one-half was gravid, while the other, as we had previously determined by examination, was of normal size. Both were united by means of a short, broad, yet not particularly thick, peduncle."

The pedicle was treated after Schröder's method of dealing with the pedicle in hysterectomy, and dropped. The patient recovered.

"The placenta was completely adherent upon the inside of the sac, and from the walls the membrane hung in necrotic folds. Tube and ovary were both normal. . . . . Our supposition was consequently incorrect. It was certainly a case of gestation, but not extra-uterine, as supposed, but intra-uterine."

I have quoted thus at length from Salin's record to show the close resemblance which his case sustained to my own. It is almost identical, except in the method of operating. The same, with slight qualification, may be said of the others. Unlike the other operators, I failed to remove the gestation sac, although, as stated, I had hoped, in view of the transverse mobility of the upper portion of the tumor, to be able to do so. As soon as the abdomen had been opened an effort was made to find a pedicle, but the broad base of the tumor dipped deeply into the pelvis, where it was firmly fixed. A further effort was made to remove the sac after it had been emptied, but it did not seem safe to make the attempt, since it was in such close contact with the deep pelvic vessels. Then the deep pelvic attachment of the placenta and cord led me finally to decide in favor of finishing the operation as described.

Although I did not at the time of the operation exactly

understand the character of the sac, I fully realized that it was an unfortunate circumstance which compelled me to leave it; but I do not think I could have done otherwise had I known its true character. Removal of the gestation sac, where it is possible, greatly simplifies the operation and doubtless renders the recovery of the patient more certain and her subsequent condition safer. The recovery of my patient, however, could not have been more rapid, nor her general health better since the operation. True, she has had the annoyance of a permanent fistula, but this must be looked upon as a safety valve, since it gives exit to the menstrual and other discharges from this, now otherwise closed, uterine horn.

I further regarded it as unfortunate that I felt compelled to stitch this rather thick-walled sac to the abdominal incision, but believe that it was the best that could have been done in the case. Even had I fully known the character of the tissue with which I was dealing, it would not have been proper to close the incision in this imperfectly developed uterine horn, as after the regular Cæsarean operation, since there was now no opening from its cavity into the cervical canal.

It is probable that the hernia which now exists in the line of the incision has resulted from a failure of that perfect adjustment of the peritoneal surfaces which is necessary to its firm union. The peritoneal surfaces on either side of the incision were not coaptated at all, the one with the other, but each side was first brought in close relation and contact with the peritoneal surface of the cyst wall.

The course and termination of pregnancy in the rudimentary horn of a bicornate uterus are probably the same, in nearly all cases, as in the ordinary tubal form of extra-uterine gestation, viz., rupture of the sack during the early months of pregnancy. The time of rupture, however, usually is not as early as where it is of purely tubal character, nor the symptoms of extra-uterine pregnancy so marked as in the ordinary tubal variety. The signs are more likely to be those

of normal pregnancy, and the danger therefore masked; the symptoms of rupture being the first evidence of the existence of an abnormality in the gestation. This view is supported by the result of Kussmaul's investigations. "Kussmaul has subjected this form of gestation to minute critical and anatomical analysis, and proves that it has often been mistaken for tubal gestation. . . . . The thirteen cases collected by him all terminated by rupture of the fruit-sac and death. The period of rupture varied from the fourth to the sixth month, the greater number bursting in the fifth month." (Barnes' *Diseases of Women*, second edition, pages 328 and 329.) The cases forming the subject of Kussmaul's analysis were mostly collected from records covering a period of two hundred years, the first one being taken from Dionis (1681).

In a few cases the gestation proceeds to full term, when fruitless efforts at expulsion of the product supervene, and the child dies. These efforts may now result in rupture of the sac and the death of the patient. This is probably the usual termination, but in rare instances the sac is strong enough to withstand the strain of the false labor. Formerly the condition was then unfortunately regarded as one of "missed-labor," and the patient "left to nature." The retained product now soon began to undergo disintegration and decomposition and to ulcerate its way out, in most instances destroying the patient by septic absorption during the process. It is true that there are, here and there, scattered through the literature of many centuries, a few cases recorded where such changes have taken place in the retained product as to render it inert, the patient enjoying good health throughout the remainder of her life. A few have also recovered after the product has undergone decomposition and been discharged by various channels, through the abdominal wall, bowel, etc.

Strange to say, until recently, the few instances of recovery had been permitted to establish the practice of non-interference in these cases. "Missed-labor," that is, the retention of a

matured fœtus within a normal uterine cavity far beyond the full term of normal gestation, probably never occurs. The term was unfortunate and the definition misleading. I fully agree with Macdonald in his view of the question, as expressed in the paper referred to above. He says: "It is, doubtless, difficult to understand how such a phenomenon could arise. It is quite foreign to the experience of obstetricians in dealing with difficult and laborious cases to find that the uterine pains should come and go, and the uterus quietly subside again into inactivity without further immediate results. The all but universal experience is, that either the uterus ruptures itself, or, becoming inflamed, the patient dies of exhaustion along with her unborn child."

The only question which is worthy of consideration regarding the treatment of these cases is: When should the proper operation for their relief (laparotomy) be performed? To which the answer should be prompt in forthcoming: As soon as the abnormal condition is recognized, unless this should happily occur before the death of the child and before it is viable, in which case an effort should be made to save its life also, by waiting, if possible, until near the full term. But if symptoms of rupture of the sac, or of death of the embryo or fœtus supervene; or if the condition of the patient should be otherwise one of gravity, as a result of the ectopic pregnancy, valuable time should not be lost in the consideration of less radical remedies. The laws of physiology and pathology teach, and experience has now abundantly proved, that the patient is safe only ofter the product of an extra-uterine gestation has been entirely removed by laparotomy. This applies with greater emphasis, if possible, where the pregnancy exists in the rudimentary horn of a bicornate uterus.

DIFFERENTIAL DIAGNOSIS BETWEEN FIBRO-CYSTIC MYOMA AND OVARIAN CYSTOMA.

With a Report of a Case Illustrating the Difficulties.

By Cornelius Kollock, A.M., M.D.,
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Not many years ago the differentiation in diagnosis between ovarian cystic and fibro-cystic tumors of the uterus, particularly where the latter are subperitoneal, was regarded by many as almost impossible. It is but a few years since Cruveilhier first recognized and described these growths, and less than fifteen years since Dr. Charles C. Lee, of the Woman's Hospital, in New York, gave the record of nineteen cases, nine in this country and ten in Europe, in which attempts were made to remove these growths, by a mistaken diagnosis of ovarian cysts. How many more cases of a like kind had occurred before that period, and how many since, will probably never be known. As so many surgeons are unwilling to make known their errors in diagnosis, a full and correct table of statistics will never be in the possession of the profession. That errors in diagnosis should often happen, is not to be wondered at, when we consider the number and variety of complications often presenting themselves, and when we think of the number of cases that fall into unskilled and inexperienced hands. Those who have had large experience, and are well versed in matters of this kind are sometimes mistaken in their diagnosis. As late as 1878, Koeberlé says, "the diagnosis of fibro-cystic tumors has been declared as impossible by almost every author."

Baker Brown says he knows "of no distinguishing marks between fibro-cystic myoma and ovarian cyst." Sir Spencer Wells admits that the darker hue of the sac-wall is the only thing that will indicate to the surgeon the importance of cautious procedure. With all his wide experience, having done the operation of ovariotomy more than one thousand times, he is still in doubt as to the correctness of his diagnosis, and always regards his incision into the abdominal cavity as exploratory. Thomas A. Emmet, a man of close observation and great experience, manfully confesses, in his published work on the *Principles and Practice of Gynecology*, to an error of diagnosis of this kind. At his first examination of a case, he pronounced it a fibro-cystic tumor of the uterus. At a later investigation, he with Sims, Peaslee, and Thomas, pronounced it a case of ovarian cyst. When an incision was made into the cavity, a fibro-cystic myoma was discovered, presenting adhesions to the bladder, pelvic fascia, and other parts. When such men confess their inability always to form a correct diagnosis in these cases, presenting often complications formidable and preplexing, and in which the signs, rational and physical, are conflicting and contradicting, it behooves those of lesser calibre and limited experience, to be cautious how they speak and still more cautious how they proceed.

It would be needless for me to repeat before the Fellows of this learned Society, the characteristic signs and symptoms of fibro-cystic myoma and ovarian cystoma. They are far more familiar with them than I am. I would, therefore, ask to be allowed to read a report of a case which I think illustrates the difficulties to be contended with in the differential diagnosis between fibro-cystic tumors and ovarian cysts.

The history of the case and operation is as follows:

V. D., a dark mulatto, aged twenty-six, married six years, has had one living child and a miscarriage at the fifth month of gestation; small in stature, height four feet eight inches; weight, never more than ninety pounds; general health has always been good. About a year previous to the miscarriage a fulness was

observed in the left iliac region, and soon afterward a hard lump was felt on that side. The patient increased rapidly in size, and, at my first examination of the case, about two years after the miscarriage, she was enormously distended. The girth at the umbilicus measured fifty-eight inches. There was considerable emaciation; facies ovariana very pronounced. Drs. Lane and Napier had seen the case and twice resorted to tapping. A large quantity of viscid fluid was removed at each operation—as much as twenty quarts at one time. This afforded temporary relief, but the fluid was soon reproduced. When I first saw the case, about seven months subsequent to the last tapping, the distention was greater than it had ever been.

There was some displacement of the uterus; it was drawn high up in the cavity, was retroverted and inclined to one side; was larger than normal, cavity lengthened, measuring three and a half inches. Menstruation had been rather free, but never so excessive as to create any discomfort; no uterine tormina. The abdominal veins were not in a varicose condition, but that is not an unerring pathognomonic sign, for, although frequent in ovarian cysts, it is not universal. No fluid was drawn at this examination, for Drs. Lane and Napier were unable to get any through a large aspirating needle and had to use a large trocar, through which it flowed very slowly. This part of the examination was omitted as there was no trocar of proper size at hand. The distention was uniform over the whole abdominal surface; no irregularities on nodular elevations; and fluctuation was perfectly distinct over the whole belly. This was too perceptible to all those present as well as to myself for any doubt to exist. There was no depression at the centre of the abdomen and no bulging at the flank when the patient lay on her back. There was mobility to the uterus, but very little motion to the tumor. The latter may be accounted for, in a measure, by the firmness of the adhesions. There was obstruction of the kidneys. Taking everything into consideration and estimating the value of the rational and physical signs, some of which were conflicting and contradictory, I concurred with Drs. Lane and Napier and pronounced it a case of cyst of the left ovary.

On the 20th of October, 1885, the operation was performed, with the assistance of Drs. Napier, Prince, David, Jennings, and

Coxe. An incision of five inches was made in the median line, below the umbilicus, and the peritoneum reached. There was much more than the usual quantity of fluid found in the peritoneal cavity. The abdominal walls were greatly thinned by excessive distention, long continued. The fibres of the recti abdominal muscles were separated and spread out like a fan. It was impossible to proceed canonically at this stage of the operation, as the usual landmarks—the fatty layer under the skin, and the aponeurotic and intermediate tendinous or muscular structures were so nearly obliterated by pressure and distention as to fail to act as guides to the knife. There was very little bleeding, owing to the thinness of the abdominal walls, which did not seem to be more than one-eighth of an inch thick. When the peritoneum was opened and the sac revealed, the error in diagnosis was exposed. The dark hue and vascular condition of the sac-wall convinced me that it was not an ovarian cyst. Emmet's trocar was now introduced and the sac evacuated. The fluid was of a dark brown color, indicating some admixture of blood, interspersed with streaks of greenish tinge. There was no appearance of pus, but evident signs of mucus. The fluid was so thick it flowed as would molasses or honey in cold weather. No sound could be heard as it poured into an empty tub on the floor. There was no coagulation on exposure to the air. A careful microscopic examination failed to detect the ovarian cell. But that does not prove much. The ovarian cell is not always found in the fluids taken from cysts of the ovary, and is seen in fluids drawn from cysts that are not ovarian. Degenerate pus sometimes teems with ovarian cells.

The adhesions were formidable, extending from the pelvic cavity to the diaphragm. Some of these were large bands of vascular tissue, requiring the knife or scissors, and one or more ligatures. A plexus of largely dilated mesenteric veins adhered to the cyst. Fortunately there were no adhesions to the bladder or liver. Adhesions to the intestines, which are generally very troublesome in cases of this kind, were comparatively slight and easily broken up. The tumor, proving to be a fibro-cystic myoma, was attached to the posterior part of the fundus uteri, a little to one side, near the entrance of the left Fallopian tube. It was not fastened directly to the body of the uterus, but was

held by a pedicle about two and a half inches in length—a hard, thick band, composed of a double fold of peritoneum, filled in with organized tissue and bloodvessels. Knowing that this band with the large sac above must be well supplied with vessels, the number, size, and relative position of which it would be well to ascertain before proceeding further, I first applied a strong clamp, and then cut the pedicle above, near the sac. This being done, two large arteries and a smaller one presented their open mouths. They were drawn out and each was separately ligated with a strong silk ligature. A double ligature was then passed through the pedicle, between the arteries and firmly secured on each side. As there was much oozing from the multitude of vessels ruptured in breaking up the adhesions, a drainage tube was left in, which did valuable service for several days. The cyst and contents weighed forty-eight pounds. The operation occupied fifty-six minutes. The patient was considerably exhausted and very much troubled with nausea for awhile, but reaction was soon established. She was comfortable the remainder of the day, and slept soundly till the latter part of the night, when she became very restless. The next day at 10 A. M., she was in a very unpromising condition. The abdomen was much distended and tympanitic, pulse 150, temperature 106°, skin and tongue dry, urine scanty and highly colored, patient listless and almost unconscious. The cavity was washed out with a pint or more of hot carbolized water; and this was repeated several times till the water came away clear. In a short time there was a material improvement in every aspect of the case. In twenty-four hours the pulse was reduced to 100, and the temperature to 99°. The patient from that time steadily improved, and is now, ten months since the operation, in excellent health.

This tumor, as has been stated, was attached to the fundus uteri, near the entrance of the left Fallopian tube. The ovary was in no way involved, and seemed to be in a healthy state; nor was the tube affected by adhesions or otherwise.

The formation and growth of this tumor, and the rapidity with which the whole thing was developed constituted an interesting feature in the case. The disintegration or breaking

down of the central solid fibroid tissue and the cystigerous process following, must have commenced at an early period of its growth, and progressed very rapidly. In a little less than three years before the operation, the patient was only aware of a small, hard lump in the left iliac region. In this short time it developed into an enormous fibro-cystic tumor, assuming the proportions of fifty-eight inches in measurement and forty-eight pounds in weight.

I can think of no better way of describing the appearance of the tumor than by comparing it to a balloon. The lower portion, or balloon-car, to which the pedicle was attached, was cup shaped, composed of solid fibrous tissue, about one inch or more in extent, while all above, reaching to the diaphragm, was a thin elastic sac, lined with a fluid-secreting membrane which extended, so far as could be ascertained, to the solid cup-shaped part. Just above the edges of the cup, here and there, thin isolated patches of fibrous tissue could be felt, but they were so thin, and as there was so much fluctuation around and above them, they were not detected till after the tumor was removed from the cavity. May we not suppose that if the tumor had been left a while longer, every particle of fibrous tissue would have been dissolved, as it were, and that nothing would have remained but a simple cyst and its fluid contents?

That this tumor was lined with a fluid-secreting membrane was evident, not only from the large quantity of fluid drawn by repeated tapping, but by the rapidity with which it was reproduced. The age of the patient, twenty-six, suggested the idea of ovarian cyst—thirty-five being the earliest period at which most writers admit the appearance of cystic fibroids—yet the hard lump in the groin, which was so perceptible to the touch externally and through the vagina, would suggest the latter. But proof of an opposing character comes in. The emaciation and well-marked facies ovariana at the early period of three years, the evident fluctuation, distinct wave-taps over the whole abdominal region; absence of menorrhagia, obstruction of the kidneys, always present more or less in

cysts of the ovary, rarely if ever in cystic fibroids; and the very short time, less than three years, in which the whole growth was developed; all were corroborative of the correctness of the diagnosis of ovarian cystoma.

Therefore, unlike Sir Spencer Wells, my incision was not an exploratory measure. I cut with the full expectation of finding an ovarian cyst, where, to my consternation, I encountered an immense cystic fibroid of the uterus.

EXPERIMENTAL RESEARCHES ON THE VITALITY OF THE FŒTUS.

Effect of Certain Modifications of the Mother's Womb.

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All obstetricians know that there are a certain number of cases in which the death of the fœtus in the mother's womb remains absolutely unexplained. The death is then attributed either to certain hereditary dispositions, to an insufficient supply of nutritive materials, to the direct transmission of a virus to the ovum, or to an acute or chronic dyscrasia in the mother or father, etc. But all these explanations do not go beyond the realm of hypothesis, and the clearing up of this question which is so important from a practical point of view has up to this time been barely attempted on the side of experiment. This is one of the most extensive of studies. It should comprehend at once both the physiology and pathology of the embryo, which are as yet on most points only outlined. In a communication made to the Congress at Washington, in the past year, we merely opened up that side of the question relating to experimental pathology, and we believe we have demonstrated that, in cases of urea intoxication of the mother, the latter survived the fœtuses, whose premature death, according to our idea, should be attributed to poisoning

by urea which accumulates in a far greater quantity in their tissues than in those of the mother. To-day, with the aid of methods borrowed from experimental physiology, we desire to treat another subject, but following the same line of thought and directing our attention to the inner organization of the mother, we have tried to discover if, in bringing about certain artificial changes there, we should not end by interrupting the vital action in the fœtal organism. First, let us say something of the technique, and of the operating procedures to which we have resorted. We have employed two methods: In the first, after having immersed the entire animal except the head in a large receptacle containing salt water (solution 5:1000) at a temperature of 38°, we made an incision of from four to five centimetres in the abdomen. The uterine cornuæ projected through this incision, and then, by a little opening made in the uterus, taking care not to injure the placenta in order to avoid hemorrhage, we exposed the fœtus. In this way we have been enabled to observe their movements, and the state of the circulation in the umbilical vessels. These observations have been made with the fœtus still connected with the mother by the placenta and left inside the amnios, or, at other times, immersed in the bath liquid (at 38°) after the opening of the amniotic sac. We have thus been able to ascertain, from one minute to another, the different modifications in the state of the fœtus produced by our experiments. But by reason of the considerable traumatism it is very evident that in these cases the experiment cannot be prolonged beyond certain limits. It is this that obliges us to have recourse to a second method. In the latter, which we have used when we wished to prolong our studies, we have simply observed the changes of state which might occur after the animal was subjected to experiment. We felt of the abdomen to see if the fœtuses were developing, then, after several days, we sacrificed the rabbit to discover the condition of the fœtuses. Here direct observation is lacking during the interval, but this method completes the first, and has been of service to us.

The animals which served us have been gravid rabbits upon which we operated at a time very near delivery. The most important physiological phenomena for the fœtus take place at the site of the placenta. It is from the mother's blood brought to the placenta that the fœtus, after a certain stage of development, receives the elements which are indispensable to its life. All the products necessary to its nutrition should be found then in the placental blood, and if we succeed in changing the blood in such a manner that all or a part of these elements are missing, or are considerably diminished, we necessarily produce the death of the fœtus.

Among all the phenomena that occur at the site of the placenta, one of the best known, up to this time, is that of respiration. It is owing to this that the blood charged with oxygen brought by the umbilical veins contributes to favor the organic oxidations necessary to the maintenance of life. When this function is disturbed, the fœtus sickens, and if the supply of oxygen is insufficient it dies of asphyxia.

To our idea the deprivation of oxygen must be one of the most frequent causes of death to the fœtus. This is why in our researches we have tried to demonstrate, above all, the necessity of the presence of a considerable quantity of oxygen in the mother's blood, if the maintenance of the fœtus's life is desired.

In order to learn if the diminution of this gas in the maternal blood had, as an effect, the death of the fœtus before that of the mother, we instituted two series of experiments.

In the first, we confined ourselves to allowing only an extremely small quantity of air to reach the mother's lungs, and in this way provoked a slow asphyxia.

In the second, we succeeded in making the oxygen almost entirely disappear from the mother's blood by causing her to ingest by the stomach a sufficient dose of an aqueous solution of pyrogallic acid.

I. Influence of Slow Asphyxia of the Mother on the Vitality of the Fœtuses.

One of the simplest means of producing a change in the chemical constitution of the blood in respect to its gaseous constituents (OCO_2), consists in modifying the supply of gases conveyed to it by the act of pulmonary respiration. By suppressing or by weakening this last function, the quantity of oxygen in the blood must evidently be diminished. This is, in fact, the result of experiment; but the results are a little different if the asphyxia is rapid, or if it is slowly developed. In the first case, when the trachea is completely obliterated, the oxygen in the system is very soon seen to diminish by one-half, and the carbonic acid to increase by one-third.

In the second case, if the trachea is only imperfectly obstructed, so as to produce very difficult breathing and an insufficient admission of air, it is seen after a certain time (several hours, several days even after the beginning of the compression) that the quantity of oxygen can be diminished in such a way that it is reduced to less than half the normal amount, while in most cases the quantity of carbonic acid in the blood is slightly diminished. It seemed to us that, in order to observe distinct effects, it was indispensable to resort to a second method of asphyxiation, which is compatible with the mother's survival and in which the carbonic acid accumulation in the blood does not occur to complicate the experiment. We therefore induced slow asphyxia in rabbits, by making the opening of the trachea smaller by introducing a tube with a capillary orifice into that organ. Pursuing our method, we first made experiments of long duration, not opening the abdomen until several days after the beginning of the asphyxia, and then other shorter experiments in which we opened the abdomen and uterus of the rabbit under water. We thus were able to observe how the fœtuses acted, and what changes in color the umbilical vessels underwent.

Let us commence by citing the experiments of the first kind.

Experiment I. *Rabbit at term; slow asphyxia; the fœtuses die, the mother surviving.—May 7.* The rectal temperature is 39.6°. At 4.45 o'clock a glass canula ending in a tube, tapering down to less than one millimetre (0.03937 inch) in diameter, is introduced into the trachea. Respiratory distress sufficiently marked. At 5.30 rectal temperature 36.5°; at 6 rectal temperature 36°. The following day, May 8th, accentuated dyspnœa; rectal temperature 34.8°.

9th. In the morning a canula of larger diameter is introduced.

10th. Rectal temperature 38.8°; very little dyspnœa. The animal seems to be enduring the tube well. At 11 o'clock in the morning the canula is closed and death follows in a few minutes. The abdomen is opened and the fœtuses at term, all macerated, are found in the uterine cornuæ, and appear to have been dead some time. With this result before us, we are warranted in supposing that the fœtuses died the first day, probably in consequence of the lack of oxygen, while the mother resisted, and had even recovered, as may be inferred from the course of the temperature, which had become almost normal by the fourth day. The experiment is decisive. Another of the same kind has given us analogous results. Let us now see what happens to the fœtus during the time that follows the incomplete obliteration of the trachea, and for this let us open the abdomen as soon as asphyxia commences.

Experiment II. *Rabbit almost at term; asphyxia of medium severity; opening of the abdomen under water; observation of the fœtuses; death of the latter before that of the mother.—May 14.* At 6.05 o'clock a female rabbit, that was covered April 18th, is taken, and immersed in a bath at 36° Centigrade, containing sulphate of soda in solution (6:1000). The abdomen and one uterine cornua are opened under water. The first fœtus noticed is alive and very vigorous. The umbillical vessels show a very marked difference in color. The fœtus is separated from the mother. At 6.15 a canula with capillary diameter is introduced into the trachea. The fœtal sac is opened: the fœtus, which is connected with the mother, and is immersed in water, is vigorous; the umbilical vessels present a difference in tint. At 6.22 the second fœtus still lives, but the umbilical vessels show absolutely the same deep coloration. At 6.30 the second fœtus is taken, living,

from the mother. At 6.40 a third fœtal sac is opened under water; the fœtus enclosed in the amniotic sac does not move; the vessels show no difference in coloration. The mother continues to breathe. The third fœtus, which did not move in the amniotic liquid, is separated from the mother, and, once in the air, it is noticed that it makes a movement of inspiration, but is very near death, as its heart no longer beats. At 6.48 a fourth fœtal sac is opened: the fœtus is inert; the same coloration of the umbilical vessels. At 6.52 it is separated from the mother; the thorax is opened, and it is ascertained that the heart does not beat. At 6.55 the last fœtal sac is opened and shows a fœtus absolutely dead. At 7.15 the mother still breathes, and has to be sacrificed.

Seven minutes after the beginning of the partial obliteration of the trachea, it can already be seen that the blood of the umbilical vein has no longer the usual red tint, and, consequently, no longer conveys a sufficient quantity of oxygen to the fœtus. Moreover, it is noticed that twenty-five minutes after beginning the experiment the fœtuses were dead, while the mother lived a sufficient length of time, since she had to be sacrificed at the end of an hour.

The following experiment gives us the same results:

Experiment III. *Gravid rabbit; slow asphyxia; opening of the abdomen; observation of the fœtuses; death of the latter before that of the mother.—May 14.* At 4 o'clock a gravid rabbit, at term, whose rectal temperature was 38.6°, is taken. A canula one millimetre (0.03937 inch) in diameter is introduced into the trachea and the abdomen is opened; then an opening is made into the uterus at the level of a fœtal sac. One of the fœtuses comes out spontaneously with the amnios entire. The difference in the coloration of the blood of the umbilical vessels is very clearly seen; that of the arteries is much deeper than that of the vein. The fœtus is very lively, moving its legs and opening its mouth as if trying to breathe. This fœtus is left in the air for five minutes, it continues to move; but the difference in tint between the arteries and the umbilical vein becomes very slight; the pulsations of the

vein are seen. At 4.08 the amnios ruptures; the blood in the two vessels has the same tint. At 4.09 the heart is observed to slacken to a notable extent. At 4.10 a new fœtal sac is opened: the fœtus was alive; its umbilical vessels showed a slight difference in coloring. The mother still lives; her breathing is dyspnœic; to avoid chilling she is put near the hot-air opening of a stove. At 4.13 the first fœtus separated from the mother is still alive, while the second remains in its amnios; it moved several times, and a difference is still noticed in the tint of the two kinds of the umbilical vessels, but it is very slight. At 4.18 the amnios breaks and the living fœtus is expelled from the amniotic pouch. At 4.20 a third fœtal sac is opened; the fœtus is alive; the difference of coloration between the umbilical vessels was scarcely accentuated; meanwhile the blood of veins is still a little redder than that of the arteries. At 4.27 the third fœtus is in the same condition; the first two still exhibit reflex movements. The mother's respiration, although labored, is not, however, very bad. At 4.42 a canula with a still smaller (capillary) diameter is introduced into the trachea, and a fourth fœtal sac is opened. At 4.44 the difference in coloration between the two vessels of this fourth fœtus, enclosed in the amnios, is barely perceptible; its own color is deeper than that of its predecessors. It does not react, and the heart scarcely beats. At 4.48 a fifth fœtal sac is opened: not the least movement, either spontaneous or reflex; no difference in the tint of the vessels. The mother continues to live; she breathes badly; respiratory effort is very accentuated. At 4.52 convulsive movements of the mother. Her temperature is 36.8°. At 4.55 opening of a sixth fœtal sac; the fœtus is well developed, but dead; its heart has ceased beating. Another convulsive movement of the mother. At 4.58 opening of a seventh fœtal sac. The fœtus dead, motionless; heart does not beat; the three umbilical vessels are identical in color. Air is restored to the mother by removing the canula. No change of coloration is noticed in the umbilical vessels at the end of three minutes. At 5.01 further convulsive movements of the rabbit; a last fœtal sac is opened, and shows a dead fœtus. At 5.07 the mother dies.

There was a division of time in this experiment. In the first

part the diameter of the tube introduced into the trachea was comparatively large, and after half an hour we observed only a shade of difference in the tint of the umbilical vessels, with lessened vitality of the fœtuses. In the second part, during which the size of the tube was reduced, we were able to assure ourselves, after a few minutes, of the uniformity of tint in the umbilical vessels, and after ten minutes of the absolute death of the fœtuses. The mother did not die until twenty-five minutes after the introduction of the second canula.

To us these facts seem conclusive; they show us that the death of the fœtus is not long delayed after the supply of oxygen, through the umbilical veins, has been diminished, while the mother may continue to live. It is even possible that the mother borrows a part of her oxygen from the fœtus, which would explain the more rapid death of the latter. To verify this hypothesis, it would suffice to measure, comparatively, the oxygen in the blood of the umbilical vessels; but this operation is really very difficult, at least in the rabbit, and our endeavors in this line have been absolutely fruitless. The death of the fœtuses before that of the mother is not less certain in cases of the slow asphyxia practised in accordance with our method. Let us see now, to finish this chapter, what happens when the asphyxia is rapid and the mother is killed in a few minutes by ligature of the trachea.

Experiment IV. *Gravid rabbit; death by rapid asphyxia; the fœtuses continue to live.—May 7.* At 11 o'clock in the morning the trachea is exposed, a thread is passed around it and the trachea gradually compressed in such a manner as to cause death by asphyxia in about five minutes. Five minutes after the respiratory movements had ceased the abdomen was opened and fœtuses were found of about three weeks' development, whose hearts beat well, and which, once separated from the mother, continued to live for a certain time. We thus obtained a contrary result to that afforded us by slow asphyxia. The fœtuses continued to live after the mother was dead, but there was nothing paradoxical in that. The conditions in the two cases were, in fact, decidedly different. In the last, the mother dies so quickly that the deprivation of oxygen did not have time to produce the death of the fœtuses, which, once detached from her, continued to live.

In the first, the action of the asphyxia was slow, and the mother not only remained a long time without supplying oxygen to the fœtus, but also, very probably, took from it the greater share of the gas which it held in reserve.

Our conclusions then remain unchanged, and we can now relate our other researches in which we have employed an experimental artifice, the ingestion of pyrogallic acid, to diminish to a considerable extent the quantity of oxygen contained in the maternal blood.

II. Action on the Vitality of the Fœtus of Pyrogallic Acid administered to the Mother.

In the very interesting work of M. Quinquaud, it follows that, contrary to what Cl. Bernard believed, pyrogallic acid introduced into the system takes possession of the oxygen of the blood-globules. By giving sufficiently strong doses of the pyrogallic acid to dogs and measuring the oxygen contained in the blood of these animals at longer and longer intervals, the deoxygenation of the vascular supply is seen to work gradually in such a manner that following the ingestion by the stomach of, for instance, 10 grammes of acid, the arterial blood of a dog containing 25 c.c. to 100 of oxygen in the normal state, at the end of an hour holds no more than 6 c.c. to 100, then later 1 c.c. 8 to 100, and even at the moment of death, 0 c.c. 65 to 100

We possess thus a way of progressively deoxygenating the blood. We have thought it convenient to use this artifice to ascertain if the survival of the fetus was possible with such a diminution in the quantity of the oxygen, and, in the contrary case, if their death occurred after a period of deoxygenation, which was not incompatible with the continuance of life in the mother.

Experiment V. *Gravid rabbit, at term; ingestion by stomach of a strong dose of pyrogallic acid; death of several fœtuses before the mother.—May 20.* At 10.30 o'clock, a solution of 3

grammes, 50 of pyrogallic acid in 2.5 c.c. of distilled water was introduced into the stomach of a gravid rabbit. The rabbit was immediately afterward immersed in a solution of salt water (5 : 1000) at 37°. At 10.34 the abdomen was opened, then the uterus, and three fœtuses were exposed; all three remained under the warm water connected with the mother by the placenta; on one the amnios was opened. At 10.40 the umbilical vein was plainly redder than the arteries of the three fœtuses. At 10.45 the difference of tint in the umbilical vessels was very slight; the fœtuses were seen to move. At 10.50 a fourth fœtus emerged from the uterus; connection with the mother by the placenta being maintained, difference of coloration was no longer perceptible in the vessels; the fœtuses made some respiratory movements in the amnios. At 11 the movements of the fourth fœtus were weaker. At 11.10 there was still no difference of tint in the vessels; the fœtuses no more move, the fourth fœtus was taken away; it was in a state of apparent death without respiratory movements, or reflex movement when the limbs were irritated; on opening the thorax feeble cardiac movements were still to be seen. At 11.15 the first three fœtuses were detached; they were dead, and cardiac pulsations were no longer apparent. At 11.18 convulsions of the mother; the uterus was opened immediately near the two remaining fœtuses; the latter were motionless, the tint of the three umbilical vessels was uniform; the fœtuses were removed, and it was ascertained that the heart of one still beat very feebly, while that of the other remained inactive. At 11.19 the mother's breathing ceased.

In this experiment the death of the fœtuses occurred only a very short time before that of the mother, and the heart of one of them was still beating feebly almost up to the moment when the mother rabbit died. The dose of pyrogallic acid was, doubtless, too strong, and the subtraction of oxygen too rapid to obtain clear results; we had, therefore, to try weaker doses.

Meantime, we should mention that twenty minutes after the introduction of the pyrogallic acid the umbilical vein no longer showed its red tint, the sign of an excess of oxygen; that at the end of forty minutes the fœtuses were in a state of apparent death, and that they were, for the most part, entirely dead four minutes after the mother's death, which occurred about fifty minutes

after the experiment was begun. Let us now diminish the dose of pyrogallic acid and see what effect is produced.

Experiment VI. *Gravid rabbit at term; injection of three grammes of pyrogallic acid; opening of the abdomen; the fœtuses seen under water; death of the latter before the mother.—May 24.* A large-sized gravid rabbit at term was taken, and at 5.22 o'clock three grammes of pyrogallic acid in water solution were introduced into the stomach by means of a sound. The dose was proportionately weaker than in the preceding experiment, for the rabbit was of larger size. She was put immediately into a sea-salt solution (5:1000) at a temperature of 37°, and the belly was opened under the water. The uterus opened at one point permitted the escape of a very strong and active fœtus, which having emerged from its amnios was left in communication with the mother. A very marked difference was seen in the coloration of the umbilical vessels. At 5.35 the fœtus was alive; a difference in the tint of the vessels was still seen. At 5.38 a second fœtal sac was opened; the fœtus was alive, the difference of coloration in the umbilical vessels was less pronounced; the fœtus was completely separated from the mother and was left in the open air its motions were very active, and it was breathing very well. At 5.40 the first fœtus, left in communication with the mother, grew less lively, it no longer moved when stimuli were applied. The difference in the color of the vessels had disappeared. At 5.41 the third sac was opened; no difference in the color of the vessels; the fœtus was alive, and was left attached to the mother and immersed in the water; the mother's respirations were so accelerated that they could not be counted; she seemed well in spite of the respiratory disturbances. At 5.44 the first fœtus was still alive; the second one was separated from the placenta and was very vigorous. At 5.45 a fourth sac was opened; the fœtus was alive, but made slight movement; no difference was seen in the color of the umbilical vessels, which were gorged with blood. At 5.48 the first fœtus was detached; it breathed once in the air, but it scarcely moved in response to stimuli while the second was dying. At 5.49 opening of a fifth sac; the living fœtus moving less and less; uniform tint of the vessels. At 5.50 the first fœtus revived a little under the influence of the air; its breathing

becomes a little less frequent, but it did not die like the second. At 5.53 the third, fourth, and fifth fœtuses still attached to the mother no longer responded to stimuli, not even when their legs were vigorously pinched. The tint of the umbilical vessels was uniform. The mother, except for panting respiration, bore up well. At 6 the second fœtus, which was the first one removed, was still vigorous. The first one, which had remained quiet with long intervals between the respiratory acts, began to move a little and to breathe more frequently. At 6.10 the mother was still alive; the third fœtus was detached; when exposed to the air it did not stir, no respiratory movements, the heart no longer beat. At 6.15 the last two fœtuses were detached by severing the funis; the hearts of both had stopped; not the slightest movements were produced by the employment of energetic stimuli. The fœtus first separated from the mother was still vigorous and lively. The second one removed was less active. The mother was breathing well. At 6.20 a sixth fœtal sac was opened; uniform tint of the umbilical vessels. No movements of the fœtus. The fœtus was detached; no respiratory movements, no cardiac pulsations; the heart was absolutely empty of blood. At 6.25, opening of the seventh and last fœtal sac; the fœtus was quite dead; its heart, arrested during systole, was void of blood. The mother still continued to breathe well. The fœtus first taken away was still very active; the other moved better when touched, and was restored to animation. At 6.45 same condition of the two fœtuses; the mother was still living. At 7.35 death of the mother.

This experiment shows us that the blood of the umbilical vein had lost its red color and that the fœtuses had commenced to suffer within eighteen minutes, at the most, after the ingestion of the pyrogallic acid. After thirty minutes the fœtuses were in a state of apparent death, and forty-five minutes after the beginning, it can be proved that they were actually dead and that the heart had stopped.

The mother did not die until the end of two hours and fifteen minutes. Moreover, it is seen that a fœtus taken from the mother fifteen minutes after the ingestion did not appear

to have suffered and remained very vigorous, while another, which was not removed until twenty-six minutes after, was languishing, sick, and did not begin to recover for an hour. It is probable that at a little later period it would not have survived, and that had the deprivation of oxygen been a little more prolonged, it would have prevented its return to life.

Let us diminish the dose of pyrogallic acid still more, and perhaps we can obtain a longer survival of the mother.

Experiment VII. *Gravid rabbit at term; stomachal ingestion of a weak dose of pyrogallic acid; death of the fœtuses; survival of the mother.*—On May 28, at 11.12, 1 gramme, 50 of pyrogallic acid in watery solution was introduced into the stomach of a gravid rabbit, covered April 30. At 11.15 the animal was immersed in a saline solution (5:1000) heated at 37°. The abdomen was opened, then the uterus at the site of a fœtal sac. One fœtus issued out of the aminios; it was left in the salt water, attached to the mother by the placenta; its motions were very lively; there was a very marked difference of color in the umbilical vessels. At 11.23 the umbilical vein was still a clear red; continual and very active motions of the fœtus's limbs; no respiratory movements. At 11.30 same state; clear red color of the umbilical vein; the arteries a dull red. At 11.35 same state of the fœtuses; the mother was breathing well. At 11.45 the umbilical vein was still of a much clearer red than the arteries. At 12.05 the mother was breathing quietly; the difference of color between the vein and the arteries still existed; movements of the fœtus's limbs; no respiratory movements. At 1.30 movements of the fœtus; there was still a difference in color between the vein and the umbilical arteries. At 3 the same state. At 4 the mother was breathing well; the difference of color between the vessels was still sufficiently distinct; the mother was breathing well; the fœtus made movements. At 5 the fœtus no longer moved; the two orders of vessels were of an equally dull red. The fœtus, which was quite dead, without cardiac pulsations and without spontaneous or reflex movements, was extracted. The mother breathed well and was quiet. A second fœtal sac was opened; uniform tints of the vessels; the fœtus did not stir under

the water; detached and exposed to the air it made feeble movements; on opening the thorax, very slow and infrequent heart pulsations could still be perceived. At 5.30 the three remaining fœtal sacs were opened successfully; there was no longer any difference of color in the vessels. The three fœtuses were quite dead, without spontaneous or reflex movements and without cardiac pulsations. At 6.30 the mother still lived and was breathing well. At 7.30 the rabbit was quiet, her respiration appeared to be normal. She was sacrificed at 8 o'clock in the evening.

This experiment seems to us conclusive. By using a dose of pyrogallic acid weak enough to permit the survival of the mother, but sufficient to deprive the blood of a sufficient quantity of oxygen, we see the fœtuses succumb. Six hours after the beginning of the experiment the fœtuses die for want of oxygen, while eight hours afterward the mother was breathing very well and would, doubtless, have recovered if a serious traumatism (the opening of the abdomen), had not obliged us to sacrifice her. Our experiments of the second kind, then, give us results exactly analogous to those of the first. The fœtal life can be stopped while preserving that of the mother, by subtracting a great part of its oxygen from the maternal blood, and this can explain to us why, in certain diseases of the mother, when her blood is very poor in *oxyhemoglobin*, we so often see abortions or the births of still-born fœtuses.

III. Action of Carbonic Acid Intoxica of the Mother on the Vitality of the Fœtus.

But oxygen is not the only gas of the blood, and carbonic acid, the residue of the oxidation of the tissues, the poisonous nature of which the labors of M. Grehant have demonstrated, can, perhaps, also exercise an influence on the vitality of the fœtus. It was interesting, therefore, to investigate if the accumulation of carbonic acid in the mother's blood, in a quantity

compatible with her life, had for effect the prevention of life in the fœtal organism.

Runge has already made quite a large number of similar investigations. He has made rabbits breathe a gaseous mixture, containing one volume of oxygen and two volumes of carbonic acid, by putting them in communication with a bladder containing the mixture, by means of a gutta-percha valve, which allowed the gas to reach the trachea without permitting its return into the bladder; and he ascertained that, in these cases, the carbonic acid accumulated in a great quantity in the tissues of the fœtus, but could act on them a long time without causing their death. Our experiments agree perfectly with those of the German *savant*. We will, therefore, limit ourselves to citing the following, which to us seems characteristic.

Experiment VIII. *Gravid rabbit at term; inhalation for one hour of CO_2; two little ones born alive on the third day.*—April 28th, at 4 o'clock in the afternoon, a rabbit very near term, whose normal temperature was 39.2°, and whose respirations were 96, was taken and made to inhale a mixture composed as follows:

CO_2	42	volumes.
O	23	"
N	35	"

The inspiration was made from the mixture, the expiration was into free air; thanks to the Muller water-valves. At 4.05 complete anæsthesia; insensibility of the cornea. At 4.20 rectal temperature 38°; breathing regular; respirations were 53. At 4.35 rectal temperature 36.6°; respirations 49. At 4.50 rectal temperature 35.8°; respirations 41. The breathing had a tendency to become irregular; two respirations imperfect, one deep. At 5.05—that is, at the end of an hour of the anæsthesia—the animal was removed from the mixture. Rectal temperature 34.9°; respirations 39; she was torpid for several instants, the paws stretched out. At 5.10 movements of the head. At 5.12 she tried to walk but stumbled and fell on her side.

At 5.15 rectal temperature 35°. At 5.20 the rabbit was on her feet and tried to save herself. At 6.15 rectal temperature 37.2°.

29th. Rectal temperature 38.5°; the animal seemed restored.

30th. The rabbit brought forth two little ones alive, to-night. These little ones appear to be very near term.

We have made quite a number of experiments of the same kind which we will not relate here by reason of the agreement in the results obtained.

Let us say, however, that when the inhalation of carbonic acid has been of long enough duration to cause the death of the mother, on opening the uterus at this moment we have several times found fœtuses entirely deprived of life; but then there are other causes besides the accumulation of carbonic acid (slowing of respiration and circulation, lowering of blood pressure) which unite with it in producing the effect, and which are sufficient in themselves to explain the fatal termination. They think that the accumulation of a considerable quantity of carbonic acid, in the mother's blood, but insufficient to cause her death, does not involve the loss of the fœtus's life, as does the diminution of oxygen, from the moment that the quantity of oxygen contained in the mother's blood is slightly modified.

Summing up, we believe that we have given experimental proof that a diminution of oxygen in the mother's blood, which is insufficient to interfere with her life, can, nevertheless, cause the death of the fœtus.

Max Runge, in a work which, although very complete, leaves many *desiderata*, comes to the conclusion that the lowering of blood-pressure in the mother is one of the most habitual causes of the fœtus's death.

According to this author, a sudden and considerable lowering of the maternal blood-pressure is a mortal factor for the fœtus, and in support of this theory M. Runge furnishes us with some experiments of section of the cord, of intense chloroformization and etherization, in which the death of the

fœtuses coincided with a considerable lowering of blood-pressure. But, according to our opinion, this coincidence ought not to be confounded with the determining cause of the death of the fœtuses, and it would have been well, before forming conclusions in so exclusive a manner, at least to have attempted to explain the mechanism of the death in these cases, and to have verified whether, in the experiments cited, the vascular contents of the mother had not undergone such a change of composition that the life of the fœtus was incompatible with it; either because of a considerable diminution of oxygen, or because the mother's blood, from the presence of superadded substances, or perhaps from substances developed in the economy, had become unfit for the fœtal nourishment. It is true that in the course of the first part of his work on acid poisoning of the mother, M. Runge gives us some experiments in which the death of the fœtus cannot, perhaps, be explained by either the accumulation of carbonic acid or by the diminution of oxygen, in which the quantities remained very nearly normal, according to the investigations of Nater. The lowering of blood-pressure alone remained therefore to explain the death to the author. Without disputing the rôle that the lowering of blood-pressure can produce in this connection, an effort that is evident to us in certain cases, we nevertheless believe that it is far from being so preponderating as the German authors affirm, and we are prepared to say that there are cases in which it does not exert any particular influence on the vitality of the fœtus. So it is, that in quite a large number of experiments made to study the action of subnormal temperature on rabbits at term, we have noticed that we could determine considerable lowering of blood-pressure and temperature for a long period, and even accompanied with transient paraplegia, without impeding the progress of gestation.

The rabbits brought forth well-developed and living fœtuses. Why, then, does not the same cause always produce the same effect? According to our opinion, it is this: the

composition of the circulatory fluid is no longer the same in cases of subnormal temperature, and in the Runge experiments. Indeed, the researches of M. Quinquaud have shown us that, when the temperature is lowered in a great degree, there is a higher oxygenation of the blood, which is at its maximum of saturation. This quantity of oxygen, which, in spite of the slow movement of the blood passes into the placenta, is sufficient to maintain the life of the fœtus, while in the other cases of lowering of blood-pressure, the amount of the oxygen in the blood remaining the same or being slightly diminished, and the circulation of this liquid being still extremely weak, the gas is not brought to the fœtus in a sufficient quantity for its nutrition. This is an additional proof which demonstrates how important it is for the health and life of the fœtus that the mother's blood should be rich in oxygen.

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